

Introduction to the Analysis of Competing Hypotheses (ACH)

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Learning Objectives



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By the end of this session,
you will be able to:

- Create an ACH matrix
- Explain the benefits of using ACH
- Fully appreciate the value of diagnostic evidence
- Use ACH appropriately, fully aware of its weaknesses and limitations and
- Recall the Eight Steps of the ACH process.

Hello, my name is .
solve tough problems.

I am an analytic methodologist. I study how analysts

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ACH is a SAT



Did You Know?

ACH is a Structured Analytic Technique (SATs).

SATs are analytic approaches that have been formalized (usually into checklists).

ACH is taught to all analysts because:

- /O It is versatile (for tactical and strategic problems)
- 👤 It can be done by one person or a group; and
- 🕒 It can be done quickly on the back of an envelope, more formally over a long period or with software.

ACH is a Structured Analytic Technique (or SAT).

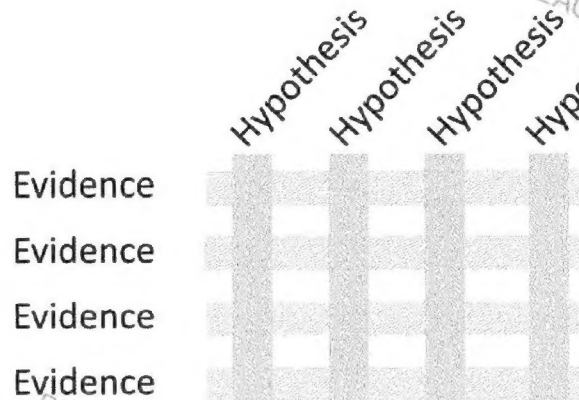
SATs are analytic approaches that have been formalized (usually into checklists). The term was coined by Kathy Pherson, a former CIA analyst and wife of author Randy Pherson who popularized the term in his 2011 book "Structured Analytic Techniques for Intelligence Analysts."

ACH is a fundamental technique, taught to all analysts because:

- It is versatile (good for both tactical and strategic problems)
- It can be done by one person or a group; and
- It can be done on the back of an envelope or more formally over a longer period with software.

Setting up an ACH Matrix

ACH arrays evidence against hypothesis



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Analysis of Competing Hypotheses (ACH) is a simple model for how to think about a complex problem when the available information is incomplete or ambiguous, as typically happens in intelligence analysis.

It is a process for making a well-reasoned, analytical judgment that begins by arraying evidence against hypothesis.

It is particularly useful for issues that require careful weighing of alternative explanations of what has happened, is happening, or is likely to happen in the future.

Rating evidence

Each piece of evidence is rated against each hypothesis as Consistent, Inconsistent, or NA.

	Hypothesis	Hypothesis	Hypothesis	Hypothesis
Evidence	C	NA	C	C
Evidence	I	C	C	I
Evidence	C	NA	I	I
Evidence	C	C	I	I

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With the evidence in rows and the hypotheses in columns, the next step is to rate each piece of evidence against each hypotheses as either consistent, Inconsistent, or Non-applicable.

This helps the analyst overcome, or at least minimize, some of the cognitive limitations that make prescient intelligence analysis so difficult.

It is important at this stage to work horizontally, not vertically. This way, each piece of evidence is re-examined in light of a different hypothesis.

ACH is grounded in basic insights from cognitive psychology, decision analysis, and the scientific method. It helps analysts protect themselves from avoidable error, and improves their chances of making a correct judgment.

Disconfirming a Hypothesis

Evidence which is inconsistent helps to disconfirm a hypothesis.

	Hypothesis	Hypothesis	Hypothesis	Hypothesis
Evidence				
Evidence				
Evidence				
Evidence				

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Although the natural tendency is to focus on the hypothesis with the most “C’s”, the “I’s” are more important because they help to disconfirm a hypothesis. This is important because while additional evidence can usually be found to help “prove” a pet theory, this evidence only advances us incrementally to certainty. We might, for example, have enough evidence to be 85% certain, then find something that allows us to be 90% certain. This game can continue indefinitely.

Our hypothesis could be, for example, that all swans are white. This is based on the fact that we’ve observed 100 swans, all of whom were white. We could try to confirm our theory that all swans are white with some research. Every time we find a new white swan, we feel more certain that our hypothesis is correct.

However, all that is needed to blow our hypothesis out of the water is one black swan. This one piece of inconsistent evidence disconfirms our hypothesis.

ACH: Definition

ACH involves:

- the identification of a **complete** set of alternative hypotheses,
- the systematic evaluation of data that is consistent and **inconsistent** with each hypothesis, and
- the **rejection** of hypotheses that contain too much inconsistent data.

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ACH involves the identification of a complete set of alternative hypotheses, the systematic evaluation of data that is consistent and inconsistent with each hypothesis, and the rejection of hypotheses that contain too much inconsistent data.

ACH: Why Should I Use It?

ACH helps overcome common analytic pitfalls:

- Rushing to a preferred explanation or conclusion
- Ignoring or discounting information that doesn't "fit" the preferred explanation.
- Failure to consider a full set of explanations or hypotheses.

These are examples of the **need for closure**, **confirmation bias**, and **tunnel vision**.

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Most analysts already use ACH without knowing it. They look for the explanation that best fits the available evidence. However, there is great value in formalizing the process.

Done properly, ACH helps overcome some common analytic pitfalls. There is, for example, the tendency to rush to a preferred explanation. "Who's the bad guy? Oh, it's probably the guy with the beard!" Once an opinion or theory is formed, we have a tendency to ignore information that doesn't fit. False confidence in our pet theory contributes to the failure to consider a full set of possible explanations. These are examples of the need for closure, confirmation bias, and tunnel vision.

Some people have a stronger **need for closure** than others. Analysts must be able to tolerate uncertainty and juggle more hypotheses for longer periods than most people.

The **confirmation bias** is the natural tendency to only look for evidence that **confirms** our hypothesis and not evidence that discounts or **disconfirms** it. This tendency is hard-wired into our brains.

According to the Department of Justice, **tunnel vision** is the leading cause of wrongful convictions in Canada and elsewhere. Source: Working Group on the Prevention of Miscarriage's of Justice, September 2004.

ACH: Why Should I Use It?

ACH is a useful method to systematically review and evaluate information.

- Helps identify most diagnostic information
- Allows you and other analysts to identify areas of agreement and disagreement
- Useful for considering the possibility of Denial and Deception

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As the complexity of a problem increases, the need for a systematic approach grows.


Many analysts find ACH useful as a data management tool. On a single page, you have everything pertinent to the problem, all nicely organized. This makes it easy to review and evaluate information, alone or in groups.

With free software like the ACH Tool, it is easy to sort the evidence by diagnosticity, allowing you to focus on key pieces of evidence.

ACH also provides a great framework for group discussion. Working through an ACH Matrix with a colleague or group, ensures that nothing is missed. It also exposes where there is disagreement.

Finally, by highlighting inconsistencies, ACH can also expose when an adversary is attempting to fool us by planting evidence that leads to a false conclusion. The evidence, for example, could be consistent with a military exercise, but if a foreign leader has been taken to a secure location, it is possible that a real attack is imminent.

Diagnosticity



Important

Diagnostic evidence or information helps you to assess which hypotheses is likely to be correct.

Evidence that is consistent with all hypotheses, has no diagnostic value.

C C C C C - not diagnostic
I I I C I - highly diagnostic

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It is important to understand the concept of “diagnosticity”.

Generally speaking, evidence that is consistent with all hypotheses, has no diagnostic value.

A high-temperature reading may have great value in telling a doctor that a patient is sick, but relatively little value in determining which illness a person is suffering from. Because a high temperature is consistent with so many possible hypotheses about a patient’s illness, this evidence has limited diagnostic value in determining which illness (hypothesis) is the more likely one.

Quiz1

Question 1 of 1

Point Value: 10

Guess which one of the following indicators is most diagnostic.
When someone is lying, they:

- ☐ Touch their nose
- ☐ Stutter
- ☐ Switch to the passive voice
- ☐ Avoid eye contact

PROPERTIES

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At any time

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Diagnosticity



Expert Advice

Diagnostic evidence or information is the focus of your argument. It is the reason you reach a particular conclusion.

Ensure it is accurate. Is the source of the information reliable?

Consider alternative explanations or interpretations. This often generates new hypotheses.

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Diagnostic evidence or information is the focus of your argument. It is the reason you reach a particular conclusion.

With ACH, a common experience is to discover that most of the evidence supporting what you believe is the most likely hypothesis really is not very helpful, because that same evidence is also consistent with other hypotheses (i.e. all C's across the board).

Once evidence is identified as highly diagnostic, it merits close examination. After all, it is likely the reason that you have reached a particular conclusion.

First, ensure it is accurate. Where did this information come from? Who collected it? When and how? Is the source of the information reliable?

Second, ask yourself if the evidence could be interpreted in a different way. In the classic movie, "Twelve Angry Men" the jury is ready to convict, but for the efforts of the lone holdout who begins to systematically challenge the evidence. An alternative explanation for the evidence often leads to a new hypothesis.

ACH: When Should I Use It?

Audio Paving

- When you have a large amount of data to absorb and evaluate.

Hypotheses

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Consider using ACH whenever you have a large amount of data to absorb and evaluate.

ACH: When Should I Use It?

Audio Playing

- When you need to be thorough.
- When you want to challenge your (and others') evaluation of the evidence.
- When you need to carefully weigh alternative explanations of what has happened, is happening, or is likely to happen.
- When you need to keep a record of the process.



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There are four other good reasons for investing time and effort in a formal ACH process.

It is a good argument to say that you have evidence to support your conclusion. It is a better argument to say that you have also considered and discounted alternative explanations. "I believe it is 'X' although it might be 'Y' or even possibly 'Z', but it is definitely not 'A', 'B', or 'C'. ACH contributes to more thorough analysis.

Everyone has a personal "lens" thorough which they view the world. When a familiar situation arises, past experiences provide us with the ability to respond quickly. On occasion, however, we might be led astray. ACH provides a means whereby others can follow our reasoning and challenge our evaluation of the evidence.

In our personal lives, the consequences of poor analysis are usually not dire. In our professional lives, poor analysis could lead to loss of life. This necessitates carefully weighing alternative explanations of what has already happened, is currently happening, or what is likely to happen.

It is also in the nature of our work that it will be audited to ensure it complies with policy. Complaints will be investigated by oversight bodies, and, when failures occur, there will be Commissions of Inquiry. At such times, it will be necessary to produce a record of our work, to explain what was done and provide a foundation for improvement.

ACH: What's the Catch?

Audio Player

- It requires creativity and area knowledge to generate a good set of mutually exclusive hypotheses.
- It takes time to create a matrix, but it brings order to your thoughts and to discussions saving time later.
- The matrix merely makes your thinking and analysis explicit. This gives you the opportunity to improve, but diligent examination is still needed.



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What is the catch with ACH?

Well, it requires creativity and area knowledge to generate a good set of mutually exclusive hypotheses.

It also takes time to create a matrix, but (on the upside) once done, it brings order to your thoughts and your discussions with colleagues, saving time that might have been spent going in circles.

All ACH really does is make your thinking and analysis more explicit. This gives you the opportunity to improve, but diligent examination is still needed.

ACH: Weaknesses

Audio Playing

- ACH does not guarantee a better answer. It is possible to skew the results toward a favoured theory by making the other hypotheses preposterous or pre-selecting evidence.
- Analysts also need to be diligent at including absent evidence (things that could or should be observed, but are not – i.e. “NEGINT”).
- If one hypothesis has 10 C’s and another only has 5 C’s, the former is not automatically more likely to be true. All C’s do not have equal weight.

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ACH does not guarantee a better answer. It is possible to skew the results toward a favoured theory by making the other hypotheses preposterous or pre-selecting evidence. For example, if you wanted to prove that Oswald shot JFK, your other hypotheses could be Elvis and Krusty the Clown.

Analysts also need to be diligent at including absent evidence (things that could or should be observed, but are not – i.e. “NEGINT”). If, for example, a company claims to be legitimate it should advertise in trade publications, protect its intellectual property, and hire workers. If it is merely a money laundering front, the tell-tale sign will likely be a missing element.

Lastly, it is hard not too automatically conclude that the hypothesis with the most evidence is correct. However, if one hypothesis has 10 C’s and another only has 5 C’s, the former is not automatically more likely to be true. All C’s do not have equal weight. When the Argentinians invaded the Falkland Islands in 1982, they had lots of evidence to suggest that the British would respond with either diplomatically or economically. The one factor in favour of a military response was Margaret Thatcher. As it turned out, she out-weighted everything else.

ACH: The Eight Step Process

Audio Playing



Checklist

1. Identify all the possible hypotheses

Be sure that they are mutually exclusive and cover all possibilities.

2. List all significant pieces of information and the arguments for and against each hypothesis. *Note the absence of evidence.*
3. Create a matrix. Hypotheses in columns; evidence in rows. Indicate in each cell whether the information or argument is consistent ("C") with, inconsistent ("I") with, or is not applicable ("NA") to each hypothesis.

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ACH has six steps. The first three are:

1. Identify all the possible hypotheses. It is important at this stage not to prematurely limit the range of possible explanations. Resist the urge to debate if a hypothesis is likely or unlikely. If there are more than eight hypotheses, try consolidating some. For example, if you thought an attack was going to take place, but the location was unknown, instead of listing 50 different countries as possible locations, you could just say, "The attack will occur in North America, Europe, or Africa."
2. List all significant pieces of evidence or information and the arguments for and against each hypothesis. Include opinions as well as logical deductions. Note the absence of evidence. How? Just ask yourself, "If this hypothesis were true, what would I expect to see." If something is missing, note it.
3. Create a matrix. Put the hypotheses across the top and the evidence down the left-hand side. Indicate in each cell whether the information or argument is consistent ("C") with, inconsistent ("I") with, or is not applicable ("NA") to each hypothesis.

ACH: The Eight Step Process

Audio Player

4. Refine the matrix.

- Remove hypotheses with lots of “I’s”.
- Remove evidence that is “NA” across the board.

5. Draw tentative conclusions. Which hypothesis seems best supported by the evidence? Which is least supported?

6. Re-examine the evidence supporting your conclusions. Does it all come from one source?

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4. Refine the matrix. Consider removing hypotheses with lots of “I’s”. Definitely remove evidence that is “NA” across the board; it is not relevant and not helping.

5. Draw tentative conclusions. Which hypothesis seems best supported by the evidence? Which is least supported?

6. Re-examine the evidence supporting your conclusions. Does it all come from one source? What if that information were wrong, misleading, or subject to a different interpretation?

ACH: The Eight Step Process

Audio Player

7. Report conclusions. The typical format is, "Sir/Ma'am, we considered eight possibilities. We were able to eliminate four. At this point, we think "X" is most likely, but "Y" and "Z" are still possible. On the basis of the information we currently have, we have a moderate level of confidence in our assessment."
8. Identify milestones, i.e. collection gaps. What would prove or disprove your conclusions?

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7. Report conclusions. The typical format is, "Sir/Ma'am, we considered eight possibilities. We were able to eliminate four. At this point, we think "X" is most likely, but "Y" and "Z" are still possible. On the basis of the information we currently have, we have a moderate level of confidence in our assessment."

8. Identify milestones, i.e. collection gaps. What would prove or disprove your conclusions? In your report, you might say, "This analysis assumes that the missiles have not been modified. This needs to be confirmed. If their range has been extended, this would have a significant impact on our conclusion."

ACH Tool



ACH was developed in the 1970s by Richards Heuer, a specialist in analytic methodology at CIA.

Chapter 8 of Heuer's book, *Psychology of Intelligence Analysis* ([pdf](#)), is devoted to ACH.



Job Aid

The ACH Tool developed by Heuer and Xerox PARC is available for your desktop via the CSIS Application Catalog.



Video

[How to use the ACH Tool](#) (6 minutes)

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Click on the link to see a short video on 'How to use the ACH Tool'.

ACH Tool: Example

Audio Player



Thomas D'Arcy McGee, one of the Fathers of Confederation, died in 1868.

He was hit by a single shot to the head as he stood outside his rooming house in Ottawa.

James Patrick Whelan was hanged for the murder.

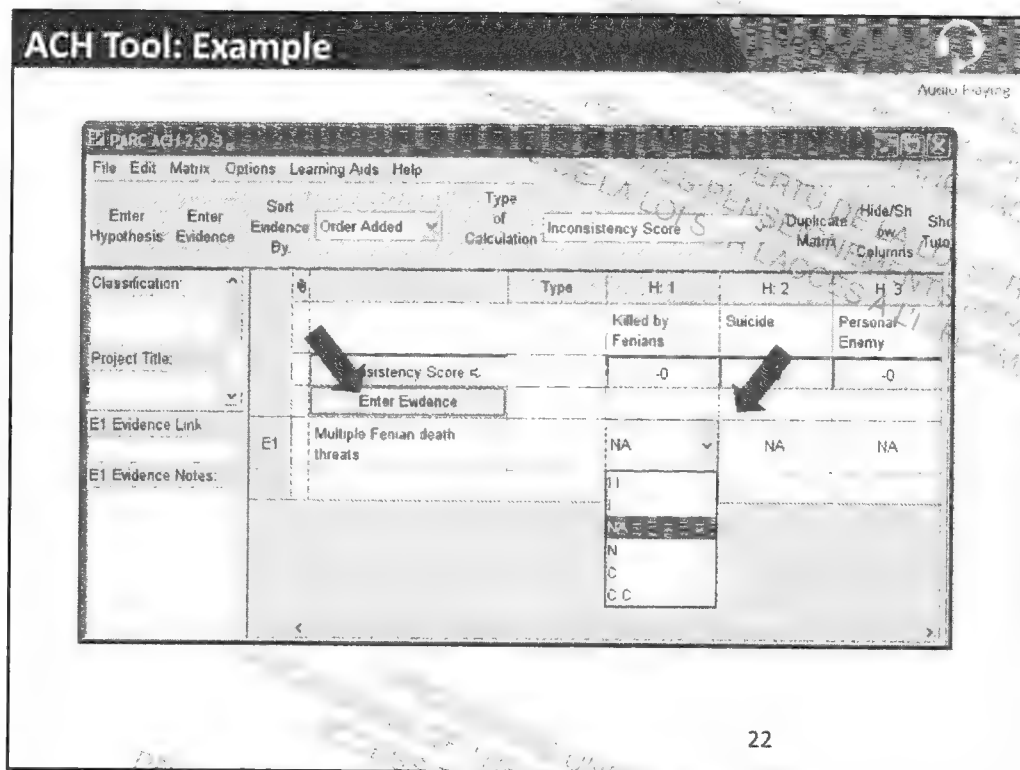
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Let's use the ACH Tool to examine the details of a famous incident in Canadian history.

Thomas D'Arcy McGee, one of the Fathers of Confederation, died in 1868.

He was hit by a single shot to the head as he stood outside his rooming house in Ottawa.

James Patrick Whelan was later hanged for the murder.



At the time, there were many theories about McGee's death.

Let's consider three hypotheses:

- 1) McGee was killed by Fenians, Irish terrorists who want to hold Canada hostage in exchange for independence for Ireland,
- 2) McGee committed suicide, and
- 3) McGee was killed by a personal enemy (perhaps someone he owed money).

Using the ACH Tool, we enter each of these hypotheses in a separate column, H1, H2, and H3.

Then we click on the Enter Evidence button and type, "McGee had spoken out against the Fenians and received multiple death threats from them."

With our first piece of evidence in row E1, we then work across the screen, scoring the evidence against each hypothesis. The ACH Tool provides a helpful drop-down menu with six possible choices.

ACH Tool: Example



CC (Highly Consistent): the item strongly supports the hypothesis being true.

C (Consistent): the item supports the hypothesis being true.

NA (Non-Applicable): the item is not relevant to the hypothesis presented.

I (Inconsistent): the item does not support the hypothesis being true.

II (Highly Inconsistent): the item strongly refutes the hypothesis being true.

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There are six options for rating evidence. The choices are:

CC (Highly Consistent): the item strongly supports the hypothesis being true.

C (Consistent): the item supports the hypothesis being true.

NA (Non-Applicable): the item is not relevant to the hypothesis presented

I (Inconsistent): the item does not support the hypothesis being true.

II (Highly Inconsistent): the item strongly refutes the hypothesis being true.

Interpreting Evidence



Expert Advice

Interpret the term "evidence" broadly (include facts and opinions).

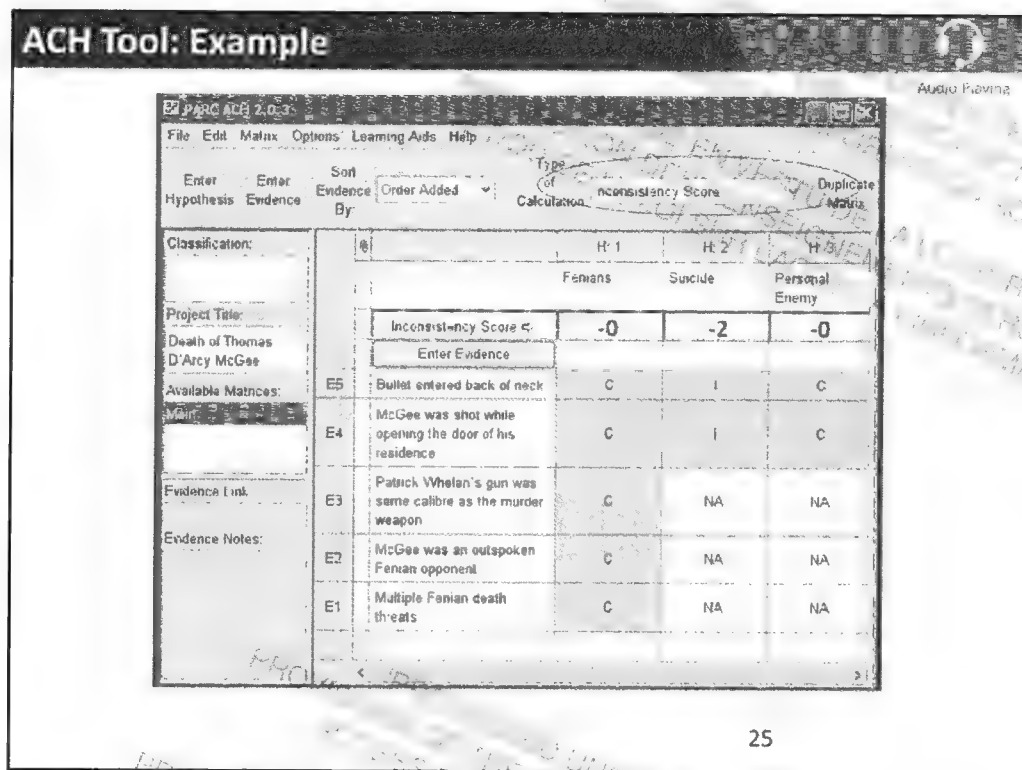
If the evidence makes you take one small baby-step in favour of a particular hypothesis give it a "C".

If the evidence makes the hypothesis less likely, give it an "I".

Evidence does not have to be irrefutable or conclusive to receive a "C".

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If the evidence makes you take one small baby-step in favour of a particular hypothesis give it a "C". If the evidence makes the hypothesis less likely, give it an "I". Evidence does not have to be irrefutable or conclusive to receive a "C".



After all our evidence is entered, we can see that there are two pieces of evidence that are inconsistent with the idea that McGee committed suicide.

- The bullet entered the back of his neck -- a very awkward way to shoot yourself.
- McGee was killed at the entrance to his residence -- a strange place to kill yourself.

Since "I's" are worth -1, this gives H2, the hypothesis that McGee committed suicide an Inconsistency Score of -2.

Note that H1 and H3 both have scores of zero because both "C's" and "NA's" are worth zero. Some feel that "C's" should be worth +1, but the ACH Tool doesn't count them, preferring instead to highlight inconsistency.

If you were presenting this chart, you would say, "Boss, I've considered three hypotheses and five pieces of evidence. So far, the evidence is least consistent with the hypothesis that McGee committed suicide. I have not yet ruled out that he was killed by Fenians or a personal enemy."

Quiz2

Question 1 of 1

Point Value: 0

To what extent do you think ACH accomplishes the following things?

	1	2	3	4	5
Serve as a briefing aid?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provide an "audit trail" of what was considered and how it was interpreted?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provide a useful overview (snapshot) of the evidence?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Permit a more objective assessment of the evidence?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Focus discussion on "diagnostic" evidence?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PROPERTIES

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On failing, 'Finish' button:

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User may view slides after quiz:

User may attempt quiz:

Goes to Next Slide

Goes to Next Slide

After user has completed quiz

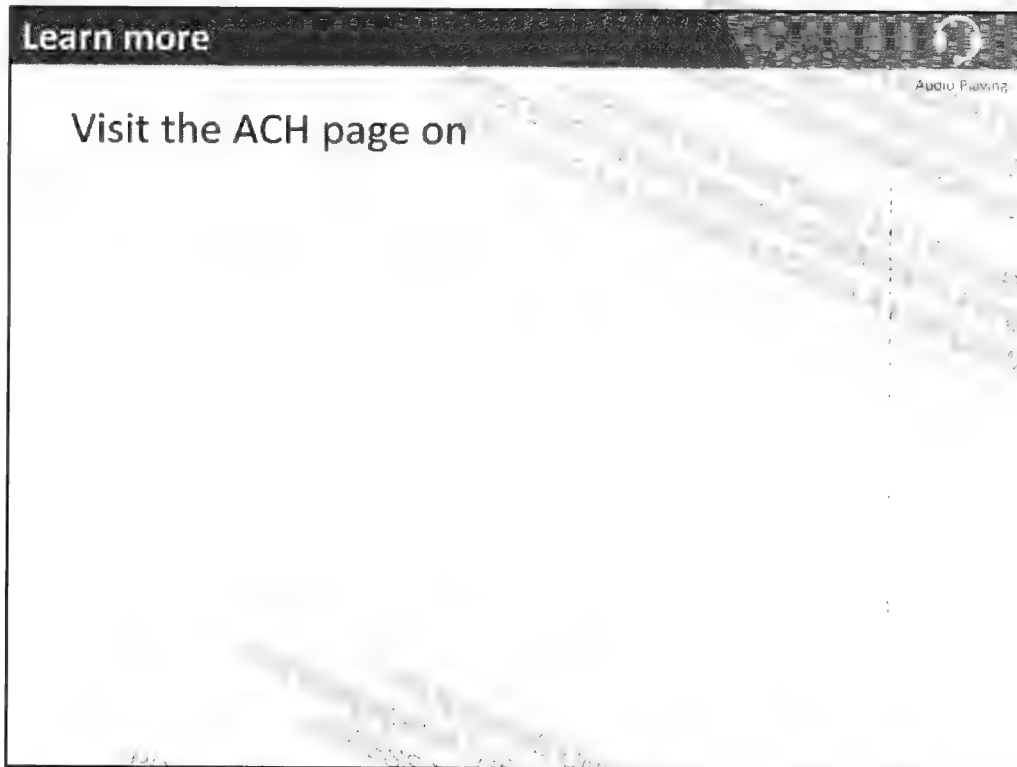
At any time

Unlimited times

Properties...



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Learn more about ACH by visiting the ACH page on [the ACH page](#). It includes links to examples of actual analytic papers where the author used ACH.

Good-bye!

Audio Playing

If you found this presentation interesting and useful, you may wish to learn more about structured analytic techniques.

In particular, you may wish to take a look at the Indicators Validator, a close cousin to ACH.

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Good-bye!

Quiz-Quotation

Question 1 of 1

Point Value: 10

Who said: "My mind rebels at stagnation. Give me problems, give me work, give me the most abstruse cryptogram, or the most intricate analysis!"

- ☐ Karl Marx
- ☐ Sir Arthur Conan Doyle
- ☐ John Stuart Mill

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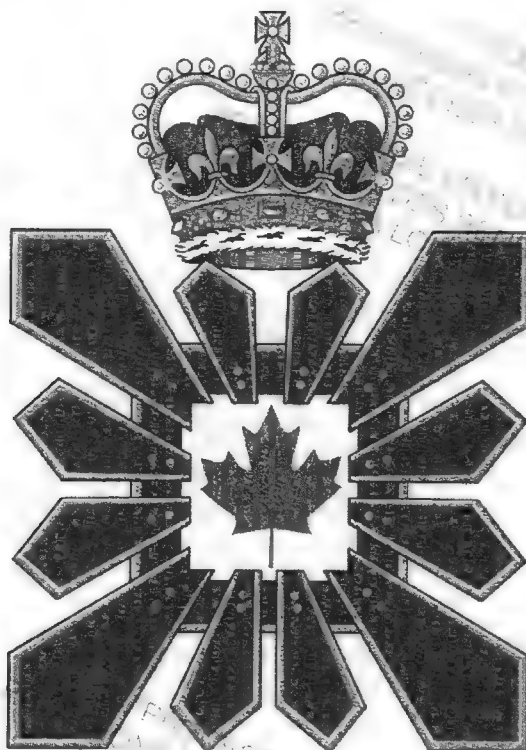
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Version/Credits

This PowerPoint is Version 1.0,
created by . on January 14, 2014.



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Compilation of Structured Analytic Techniques

2016-10-01

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Diagnostic Techniques

Organize / Rank / Sort / Assess / Visualize / Filter / Compare / Conceptualize / Decompose

Technique	Description	When is it useful?
<u>Analysis of Competing Hypotheses</u>	Arrays evidence against rival or "competing" hypotheses. Helps disconfirm hypotheses based on inconsistent evidence.	Too much data? Too many theories? ACH organizes everything into a neat grid. It also helps mitigate the "confirmation bias".
<u>Bayesian Analysis</u>	Infers the probability of an event re-occurring based on previous occurrences.	Worried about "false positives" and "false negatives"?
<u>Chronologies and Timelines</u>	Displays a sequence of events (in a list or graphically in a flowchart).	Looking for correlations or patterns? A timeline may make relationships, gaps and discrepancies more apparent.
<u>Cross-Impact</u>	Examines how variables/drivers/factors inter-relate (affect one another).	How will changing one variable affect the other variables?
<u>Force Field Analysis</u>	Investigates the balance of forces acting on issue or influencing a change.	Need to clarify the effect of key drivers or forces?
<u>Gantt Chart</u>	Shows the phases of a project.	How long will it take? How many steps?
<u>Heat Map</u>	Depicts hot-spots of activity using a colour scale.	Need to identify/highlight areas of concern?
<u>Indicators of Change (I&W)</u>	Uses a set of observable phenomena to track events, spot emerging trends, and warn of change.	Need to anticipate something? I&W helps identify persons, activities, developments, or trends of interest.
<u>Indicators Validator</u>	Determines the strength (reliability) of an indicator.	Limited in time or money in which indicators to watch? Need to defend the use of an indicator?
<u>Key Assumptions Check*</u>	Employs a process to identify, limit, check, assess, and revise the assumptions underpinning fundamental judgements.	Want to expose and test your assumptions? KAC identifies collection gaps, generates alternative hypotheses, and exposes weaknesses in arguments
<u>Linchpin</u>	Breaks a predictive argument into drivers, linchpins, triggers and signposts.	Want to deconstruct an argument using non-academic terms?
<u>Link Charts (Analyst's Notebook)</u>	Visually depicts relationships.	Looking for a way to uncover, interpret, and display complex information in easily-understood form?
<u>Multiple Attribute Analysis*</u>	Uses a set of defined and weighted criteria to compare things.	Wondering which might be the best option or highest priority?
<u>Path to Violence*</u>	Sorts groups or individuals into an ascending series of six observable steps.	Wonder who is most likely to commit a violent act? The Path to Violence provides a good visualization that is useful for briefings.
<u>Quality of Information Check</u>	Examines the reliability of information and the credibility of the source.	Unsure whether the information is accurate?
<u>Rumsfeld Square*</u>	Forces a more comprehensive consideration of a problem and identifies areas of risk.	Planning a research project? Need to improve a collection plan?
<u>Social Network Analysis</u>	Maps and measures relationships or links among individuals, groups, or organisations.	Need to determine who is most central in a network? What to know the role someone plays?
<u>Weighted Rankings</u>	Orders choices according to a weighted comparison.	Need to decide which alternative is best / most likely?

*Developed or substantially modified in Canada

Challenge Techniques

Test / Refute / Invert / Expose / Examine / Articulate / Probe / Analyze / Find Alternatives

Technique	Description	When is it useful?
<u>Argument Mapping</u>	Visualizes the structure of an argument, exposing co-premises masquerading as support elements.	Want to see the structure of an argument?
<u>Devil's Advocacy</u>	Tests an argument by attempting to prove it is flawed or fundamentally incorrect.	Want to make your argument bullet-proof?
<u>Dialectic Inquiry</u>	Challenges the assumptions and evidence used to frame and support an existing analytic position to arrive at plausible alternative explanations through discussion.	Need to discuss a draft paper without making it personal?
<u>High Impact – Low Probability</u>	Alerts decision-makers to an unlikely event that would have major impact.	Does a neglected issue need more attention?
<u>Outside-In Thinking</u>	Identifies the range of external forces, factors, events and trends that would have an impact on shaping an issue.	Wondering if there are any external factors that should be considered?
<u>Peer Review</u>	Solicits constructive criticism.	Is your paper ready for publication?
<u>Pre-Mortem Assessment</u>	Assumes that, in the future, an assessment has proven to be "spectacularly wrong" then works backward to find the flaw.	Worried about how your assessment might be wrong? A shift in perspective may help.
<u>Red Team</u>	A team, emulating your adversary, tries to beat you. The simulated conflict exposes weaknesses and vulnerabilities.	Could your adversary's tactics, techniques, and procedures defeat you? Want to anticipate their next move?
<u>Team A – Team B</u>	Compares the analysis of two independent teams.	Don't want a homogenized or consensus opinion? This approach highlights the reasons for disagreement.
<u>Venn Analysis*</u>	Displays how concepts overlap, when conditions are met or characteristics shared.	Does a "perfect storm" exist? Is there a logical inconsistency?
<u>What if? Analysis</u>	Assumes that an event has occurred then works backward to explain how it came about.	Want a good technique to facilitate a group discussion?

*Developed or substantially modified in Canada.

Imagination Techniques - new insights, alternative outcomes, and different perspectives
 Speculate / Project / Interpolate / Create / Anticipate / Devise / Develop / Generate

Technique	Description	When is it useful?
<u>Alternative Futures Analysis</u>	Arrays one driver of future events against another to create a matrix with four quadrants, each of which is an alternative future.	Want to stretch your imagination and consider a wider range of possible futures?
<u>Bow Tie*</u>	Correlates the hazards (precursors) that could lead to an undesirable event with the consequences that could follow.	Searching for proactive and reactive control measures?
<u>Cone of Plausibility</u>	Identifies the drivers and assumptions that create a baseline scenario then changes the assumptions to generate two alternate scenarios: a plausible variation and a wildcard.	Asked about the future? This disciplined scenario generation technique helps analysts imagine plausible futures and their effects.
<u>Concept Map</u>	Displays the relationships between concepts.	Just undertaking a study or starting a project? This technique creates a high-level overview of the key concepts and their interconnections.
<u>Counterfactual Reasoning</u>	Forces a more complete consideration of an outcome that is conditional on a previous event.	What will B look like if A happens? If the problem can be put in these terms, counterfactual reasoning can help you to better understand precursors and potential outcomes.
<u>Decision Trees</u>	Establishes chains of decisions and/or events which illustrate a comprehensive range of possible future actions.	Trying to imagine possible permutations of a process? Want to create a model for how events could unfold.
<u>Delphi Method</u>	Produces reliable consensus judgements from a large and diverse set of experts.	Want to capture suggestions and critical comments anonymously? Through multiple iterations this technique finds a consensus.
<u>Force Field Analysis</u>	Visualizes the forces for and against a change proposition, problem, or goal.	Need to visually represent the forces at play?
<u>Hypothesis Generator</u>	Provides a structured mechanism for generating a wide array of hypotheses.	Want to broaden your thinking?
<u>Hypothesis Review Technique</u>	Mitigates mirror-imaging bias and helps understand an adversary's potential mitigation strategies.	What are the alternatives from the adversary's point of view?
<u>Issue Redefinition</u>	Helps clarify the needs of a client.	Is the question or problem unclear?
<u>Linchpin Analysis</u>	Structures a predictive problem by defining the factors which drive and influence a situation.	Want to focus your analysis on the key drivers shaping an issue?
<u>Mind Maps</u>	Improves critical and creative thinking by depicting relationships visually.	Having difficulty visualizing a problem or topic?
<u>Nominal Group Technique</u>	Generates new analytic ideas, hypotheses, or concepts.	Want a structured approach to elicit ideas from participants, facilitate group discussion, and to produce a rank ordered or prioritised list of ideas?
<u>Quadrant Hypothesis Generation Technique</u>	Generates four main hypotheses for a topic or event.	How do the two key drivers shaping an issue or situation interact?

<u>Red Cell</u>	Invents plausible scenarios using an internal think tank created to help develop broader peripheral vision and avoid surprise.	Worried about being blind-sided by an issue or problem no one ever considered?
<u>Red Hat*</u> <u>(Anthropology)</u>	Provides a deeper and better understanding of a group, tribe, or organization.	Want to understand your adversary from their perspective? Baffled by "irrational" behaviour?
<u>Red October</u>	Assess both the feasibility and impact of an adversary's actions.	Want to anticipate threats but be realistic about feasibility and consequences?
<u>Structured Brainstorming</u>	Generates new ideas and concepts from a group using divergent-convergent thinking.	Want to use a guided group discussion to broaden your thinking?

*Developed or substantially modified in Canada

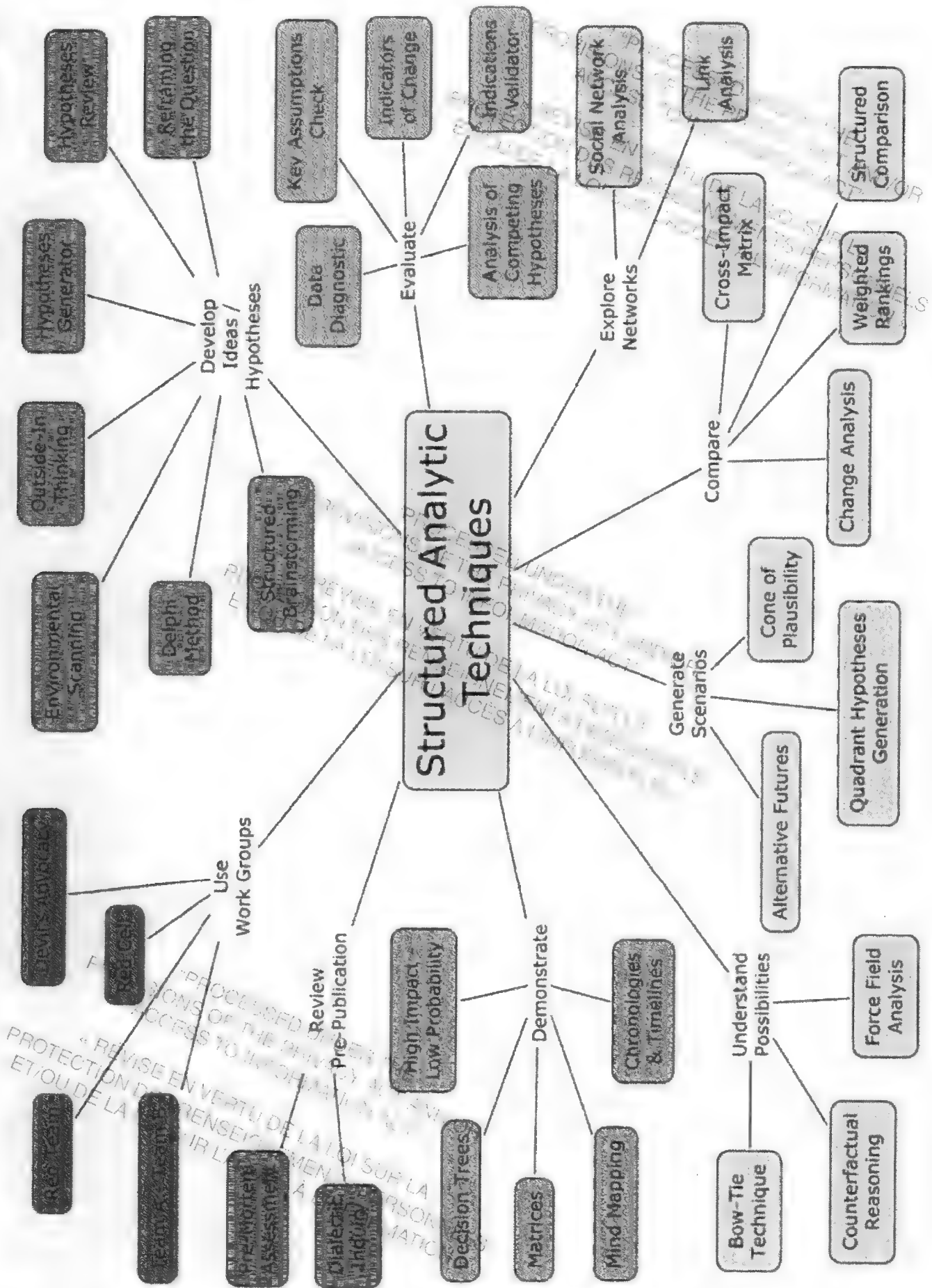
In 2007, Structured Analytic Techniques (SATs) were identified as one of the **Eight Best Practices of Intelligence Analysis** by Canada's Intelligence Assessment Coordinating Committee.

Best Practices for Intelligence Analysis

1. Reflect on the problem, determining possible approaches.
2. Be resourceful and systematic when collecting information, documenting sources and noting caveats on usage.
3. Critically evaluate the quality of all information.
4. Develop multiple hypotheses/ explanations.
5. Challenge assumptions, mindsets and biases.
6. Build collaborative networks.
7. Use structured analytic techniques.
8. Write clear, concise, well-documented, and client-focused reports.

Intelligence Assessment Coordinating Committee

Canada



	Helps clarify the question	Good for reviewing and assessing existing material	Generates new ideas	Helps select between options	Visual Output	Ideal for group	Soft-ware	Labour (Time) intensive	Quick Version	Need Quantitative Data	Difficulty/ Complexity Is training or help needed?	Page
negligible small modest strong degree high / strong												
Diagnostic Imaginative Challenge												
Alternative Futures Analysis	●	○	●	●	👁️	↑↑↑		⌚			●	12
Analysis of Competing	○	●	○	●	👁️	↑↑↑	📊		✓		○	13
Argument Deconstruction / Mapping	○	●	○	○	👁️		📊		✓		●	14
Bayesian Analysis	○	●	○	●	👁️		📊			📈	●	15
Bow Tie	○	○	●	●	👁️						○	17
Brainstorming	●	○	●	○	👁️	↑↑↑			✓		○	18
Brainwriting	●	○	●	○	👁️						○	TBA
Chronologies and Timelines	○	●	○	○	👁️	↑↑↑				📈	○	19
Concept Map	●	○	○	○	👁️	↑↑↑	📊				○	20
Cone of Plausibility	○	○	●	●	👁️						○	22
Counterfactual Reasoning	○	○	●	●	👁️						○	23
Cross Impact Analysis	○	●	○	○	👁️						○	25
Deception Detection	○	●	○	●	👁️						○	26
Decision Trees	○	○	○	●	👁️					📈	○	27
Delphi Method	○	○	○	●		↑↑↑	📊	⌚			○	28
Devil's Advocacy	●	●	○	○							○	29
Dialectic Inquiry	○	●	○	○	👁️	↑↑↑					○	30
Force Field Analysis	○	●	○	○	👁️	↑↑↑					○	31
Gantt Chart	●	○	○	○	👁️		📊	⌚			○	32
Heat Map	○	●	○	○	👁️		📊	⌚	✓	📈	○	33

	Helps clarify the question	Good for reviewing and assessing existing material	Generates new ideas	Helps select between options	Visual Output	Ideal for group	Soft-ware	Labour (Time) Intensive	Quick Version	Need Quantitative Data	Difficulty/ Complexity Is training or help needed?	Page
negligible small modest strong degree high / strong												
High Impact/ Low Probability												34
Indicators / Signposts of Change									✓			35
Indicator Validator									✓			36
Issue Redefinition												37
Key Assumptions Check						↑↑↑↑						39
Linchpin												41
Link Charts									✓			42
Mind Maps						↑↑↑↑						43
Morphological Analysis												TBA
Outside-In Thinking						↑↑↑↑						44
Path to Violence									✓			45
Peer Review						↑↑↑↑						47
Pre-mortem Analysis						↑↑↑↑						50
Quality of Information Check												51
Red Cell												53
Red Hat												54
Red October						↑↑↑↑						56
Red Team						↑↑↑↑						57
Reverse Brainstorming						↑↑↑↑						TBA
Rumsfeld Square						↑↑↑↑						59

	Diagnostic Imaginative Challenge	Helps clarify the question	Good for reviewing and assessing existing material	Generates new ideas	Helps select between options	Visual Output	Ideal for group	Soft- ware	Labour (Time) Intensive	Quick Version	Need Quantitative Data	Difficulty/ Complexity Is training or help needed?	Page
○ negligible													
◐ small													
◑ modest													
◒ strong degree													
◓ high / strong													
Six Thinking Hats		◐	◐	◐	◐		↑↑↑					◐	TBA
Social Network Analysis		○	◐	◐	◐	②		☑	⌚	✓	📊	◐	60
Starbursting		◐	○	◐	○		↑↑↑					◐	TBA
Statistical Analysis		○	◐	◐	◐	②		☑	⌚	✓	📊	◐	TBA
String of Pearls Analysis		◐	◐	◐	◐			☑	⌚			◐	TBA
Structured Comparison		○	◐	◐	◐	②		☑	⌚	✓	📊	◐	62
Surrogate Adversary/Role Play		○	○	◐	◐				⌚			◐	TBA
Team A/Team B		◐	◐	○	◐	②	↑↑↑					◐	63
Venn Analysis		○	◐	◐	○	②						◐	64
What If-Analysis		◐	◐	◐	◐		↑↑↑					◐	66
Weighted-Rankings		○	◐	◐	◐	②						◐	67

*Adapted from NATO Alternative Analysis Handbook, Sept 2012

Structured Analytic Technique



Alternative Futures

Purpose

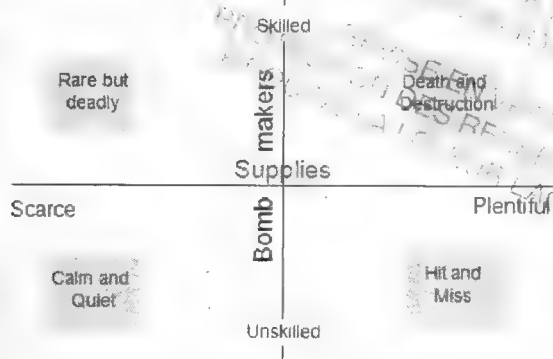
To systematically identify a range of alternative futures, monitor for signposts, and thereby avoid surprise.

Description

A group of experts collectively identify a set of drivers (forces, factors, or events) that are likely to shape an issue.

During the "quadrant crunching" phase, drivers are arrayed in 2x2 matrices where each quadrant is a different "future world". E.G.

Improvised Explosive Device (IED) Attacks



Analysts then ask: *What signposts or indicators would exist on the path to each "future world"?*

Usage

Medium and long-term strategic scenarios.

Requirements

The drivers are usually generated through a structured brainstorming session. This provides a rich, full set.

The quadrant crunching phase can be more quickly accomplished by dividing the group into break-out teams, each with a paired set of drivers to consider.

Strengths

Most other efforts to anticipate future events usually end up with minor variations of current trends.

"Across the government, there were failures of imagination, policy, capabilities, and management."

- 911 Commission Report

The Alternative Futures technique forces analysts to look at not only the most likely scenarios but also those that might seem unlikely, even counter-intuitive. Some of these may have high impact.

Weaknesses

A highly efficient and effective technique for generating an extremely broad set of alternatives when faced with very little data and high degrees of uncertainty, but ...

- it takes time and effort to do well and
- a diverse group of participants is critical.

Also, it is difficult to manage more than eight drivers. Four drivers can be combined six different ways, six drivers can be combined 15 ways, and eight drivers 28 ways. Fortunately, drivers can usually be consolidated to simplify the exercise.

Theory put into Practice at Meech Lake

On October 31, 2007 over 30 intelligence analysts from nine different departments and agencies attended an "Alternative Analysis Exercise" at Meech Lake near Ottawa. The event was a deliberate mix of subject-matter experts and analysts on the periphery of a key security issue for Canada. One veteran analyst commented that, despite intimate familiarity with the topic, the exercise forced him to consider a fuller range of possible outcomes.

Structured Analytic Technique



Analysis of Competing Hypotheses (ACH)

Purpose

To systematically evaluate evidence against rival or "competing" hypotheses and thereby avoid the natural human tendency to "anchor" to a favoured hypotheses.

Description

Human beings have an innate tendency (a "cognitive bias") to jump to conclusions. Investigators and analysts are no exception. They are quick to form a hypothesis. This is not a problem except when evidence is ignored or excluded because it doesn't fit the hypothesis.

This "satisficing" approach risks the "confirmation bias" – selectively hearing or seeing only what supports a preformed judgment or opinion.

ACH arrays the evidence against multiple hypotheses to find the best fit and disconfirm competing hypotheses.

Experienced investigators and analysts do this to some extent already, but ACH does a great job of organizing the evidence and forcing a more systematic evaluation.

Usage

ACH is best suited for tactical analysis. It struggles with strategic analysis because the evidence is more subjective.

Requirements

One simply places hypotheses in columns and evidence in rows, creating a grid or matrix. Then one scores each piece of evidence as either *consistent*, *inconsistent*, or *neutral* with each posited hypothesis.

This can be done in MSWord in a table, using MSExcel or with the ACH Tool, free software developed by Richards Heuer and Xerox Parc.

Strengths

In theory, ACH encourages a more objective assessment of the evidence.

An ACH grid provides a useful snapshot that:

- summarizes all the thinking (not just the evidence in support of the leading hypothesis);
- serves well as a briefing aid;
- helps identify where opinions differ in the evaluation of evidence;
- provides an audit trail of what was considered and how it was interpreted.

Additionally, the ACH Tool can sort evidence by "diagnosticity." This helps analysts focus on evidence that discriminates between the varying hypotheses. It may reveal, for example, that the leading hypothesis is mainly supported by evidence from a single human source of unconfirmed reliable.

Weaknesses

ACH does not guarantee a better answer. It is possible to skew the results toward a favoured theory by setting up "straw man" hypotheses or pre-selecting evidence.

Success depends on creatively brainstorming multiple hypotheses that are mutually exclusive. The former requires time, while the latter may be unrealistic in that several things may be happening at once.

Analysts also need to be diligent at including *absent* evidence (things that could or should be observed, but are not – i.e. "NEGINT").

Further Reading:

- ACH was developed in the 1970s by Richards Heuer, a former CIA Directorate of Intelligence methodology specialist. Chapter 8 of Heuer's book, The Psychology of Intelligence Analysis, is devoted to ACH.

To download the free ACH Tool, go to:
<http://www2.parc.com/istl/projects/ach/ach.html>.

Structured Analytic Technique



Argument Mapping

Purpose

To better understand the structure of arguments.

Description

Argument mapping is, roughly, making a picture of reasoning. More precisely, it is the graphical display of the structure of reasoning and argumentation (see [Austhink video](#)).

Typically, argument maps are box-and-arrow diagrams, a bit like flowcharts.

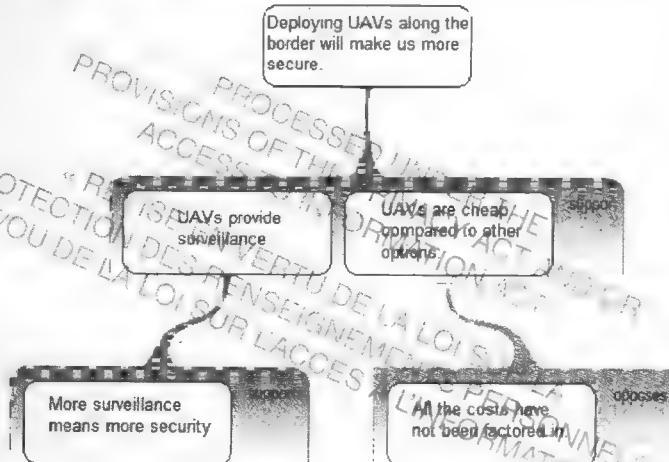
Argument mapping belongs to a family of "thought mapping" techniques which includes [concept mapping](#) and [mind mapping](#).

Usage

Argument maps can be used to help write an essay (see [video](#)) or visualize a complex argument made in court.

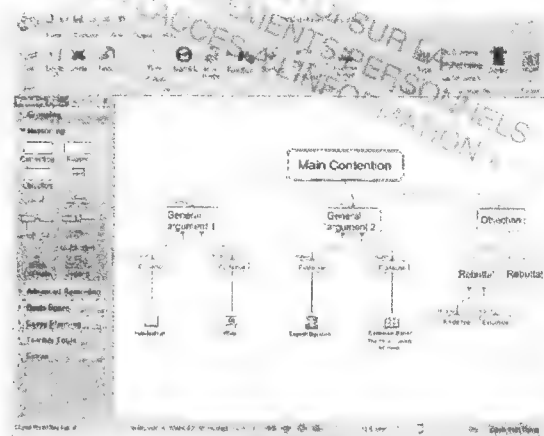
Requirements

A typical argument map starts with a statement, E.G. "Deploying UAVs along the border will make us more secure." This is contained in a box at the top of the page. Underneath, boxes are added containing evidence or arguments that support and oppose the statement.



Strengths

Software-aided argument mapping enables analysts to rapidly build, modify, view and share their work.



Rationale

Common errors such as confusing helping premises for separate reasons are easy to spot.

Some [evidence](#) suggests that it can help improve reasoning. Tests on students at the University of Melbourne showed improvement of 0.8 of a standard deviation as measured by the [California Critical Thinking Skills Test](#). Another [study](#) found three times the gross gain typical of other endeavors.

Weaknesses

The best results require intensive practice on computer-supported argument mapping in a highly-structured setting.

The approach is surprisingly time-consuming. It is difficult to know when to stop.

It may degenerate into a game of Boxes-and-Arrows, if insufficient effort is put into thinking about *why*, or *how*, or *how likely* one thing connects to another.

Further Reading

- [Argument Mapping Tutorials](#) – from Austhink.
- [Argument Mapping Intro](#) (video) Kookaburra Case

Structured Analytic Technique



Bayesian Analysis

Purpose

To assess the likelihood of an event or reliability of an indicator.

Description

In Bayesian analysis, the probability of an event occurring in the future is inferred from previous occurrences of the event.

Say our neighbours have moved troops to our border 1000 times, and on 100 of these occasions actually invaded. On 90 of these occasions, they moved supplies to the front lines before they invaded. Most people think that this indicator is 90% accurate because it was present 90 out of 100 times before war occurred. They fail to include the *false positives*, E.G. the 90 occasions when the indicator was present but NO invasion followed. They also fail to include the *false negatives*, E.G. the 10 occasions when the indicator was absent but an invasion occurred (see table below).

	Indicator present	Indicator NOT present
War	90 – true positive	10 – false negative
No War	90 – false positive	810 – true negative

To find the actual reliability of the indicator, we use the following formula:

$P(B|A)$ is the conditional probability of B given A.

$P(A)$ is the prior probability or marginal probability of A. It is "prior" in the sense that it does not take into account any information about B.

$$P(A|B) = \frac{P(B|A) \cdot P(A)}{P(B)}$$

$P(A|B)$ is the conditional probability of A given B. It is also called the posterior probability because it is derived from or depends upon the specified value of B.

$P(B)$ is the prior or marginal probability of B.

"A" is the 180 (90 + 90) times the indicator is observed
 "B" is the 100 times war occurred

The formula tells us that if we see the indicator, there is an 81% chance of war. The presence of false positives and false negatives has downgraded the reliability of the indicator.

Usage

Use Bayes whenever the question is: "How likely is X, given Y". This often occurs in cases with indirect (circumstantial) evidence.

Requirements

The analyst must accurately estimate the probability of events. This requires good data and reasonable assumptions.

Strengths

This technique helps validate the reliability of indicators, providing numeric values.

It helps counter the bias in favour of new or vivid evidence.

Weaknesses

The calculation of a priori probabilities is critical. Miscalculation biases the final result.

The math can be intimidating for some.

Further Reading

- Bayes' Theorem for Intelligence Analysis, (1972), by Jack Zlotnick in H. Bradford Westerfield, ed. Inside CIA's Private World: Declassified Articles from the Agency's Internal Journal (New Haven: Yale University Press, 1995).
- Fisk 1972. The Sino-Soviet border dispute: a comparison of conventional and Bayesian methods for Intelligence warning. Studies in Intelligence 16:2 53-62.
- Schweitzer 1976. Bayesian analysis for intelligence: some focus on the Middle East. 20:2 31-44
- Captain David Lawrence Graves, ISAF, Bayesian Analysis Methods for Threat Prediction, MSSJ Thesis (Washington: Defense Intelligence College, July 1993)

Bayes in Court

Bayes' theorem is used in court cases to analyse statistical evidence.

However, in 2010, a case in the UK fell apart on appeal when the judge decided the theorem did not provide a sufficiently reliable estimate of probability. The problem was insufficient data.

The case involved a Nike shoeprint that was found at a murder scene. British police were able to match it to a suspect, but the issue brought up on appeal was the reliability of the match.

At trial, evidence was presented that between 1996 and 2006, Nike distributed 786,000 pairs of trainers. On this basis, a calculation could be made on the likelihood of the suspect having the same shoe as the killer.

However, several questions immediately arise.

- Why use 1996 as the starting year? Why not 1995 or 1997? Why not start in June of 1998?
- Does Nike really know precisely how many shoes they distributed? How many were actually sold? Does this include online sales?
- Are there other shoes not manufactured by Nike which have similar soles? What about counterfeit Nike shoes?
- What is the population of the immediate area in which the suspect lived or murder took place? Should the "immediate area" be one block or a square mile?

The decision on how to "bound" the initial dataset has huge implications for the reliability of the result.

No one knew exactly how many Nike trainers of the type worn by the killer were in the country at the time of the murder so the judge decided that Bayes' theorem shouldn't be used.

But just because there isn't a precise count, doesn't mean that the result is worthless. Numbers that are unknown can be estimated. As long as these estimates are reasonable, the result will be reasonable.

In the aftermath of the trial, it was reported in the media that the judge had banned the use of Bayesian analysis in the court. Not so. He banned unwarranted precision. He felt that Bayes analysis gave a misleading sense of precision if the underlying information was not 'firm'.

It seems the prosecutor in this case overplayed his hand in presenting Bayesian analysis as definitive. Had he been more cautious, using it as just one several means of drawing a connection between the shoeprint and the suspect, it would not have been the focus of the case and become such an issue.

In the end, this case is a cautionary tale for the appropriate use of probability and statistics. It reinforces the need to be honest about limitations. It also reminds us that complicated explanations can be a house of cards, impressive but flimsy.

Structured Analytic Technique



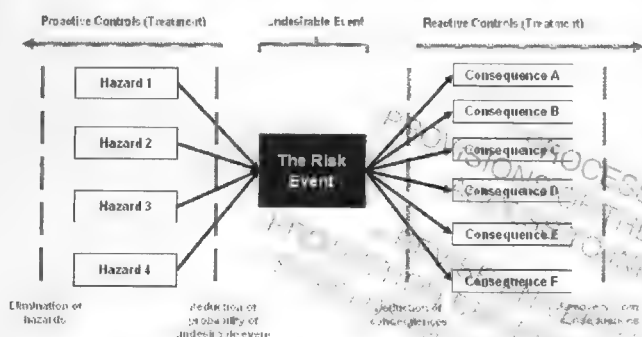
Bow Tie

Purpose

To examine precursors and consequences of undesirable events to develop means to reduce risk and enhance recovery.

Description

This technique correlates the hazards (precursors) that could lead to an undesirable event with the consequences that could follow.



The technique also allows the development and consideration of both proactive and reactive control measures, and can show the effect of a policy, or physical change on the issue.

Usage

Begin by identifying an undesirable event. This could be anything from the failure of policy to the rise of a dictatorial leader.

Then identify hazards that could lead to this event. Hazards can be factors or drivers – i.e. circumstances, facts or influences that, either separately or in combination could cause the event to take place. Depending on the number of hazards identified, a process of ranking them by likelihood or impact – may be necessary.

Finally, identify the consequences of the undesirable event – physical, psychological, internal or external, etc. It may be useful to separate them into categories or rank them in

Requirements

In-depth area knowledge.

Imaginative thinking.

Broad perspective (possibly aided by outsiders).

Strengths

Once hazards and consequences are defined, the impact of both proactive and reactive control measures can be considered.

Proactive controls reduce or eliminate hazards.

Reactive controls reduce the potential impact of the event and assist in the recovery from the consequences.

Weaknesses

Only works on risks which have been identified. Consequently, the analysis will only ever be as good as the risk identification process.

Bow-Tie Analysis "Unauthorized Computer Access"

Undesirable Event: An unauthorized person gains access to our internal network.

Hazards: An intrusion could occur because we have not changed default system passwords, new patches have not been installed, an ex-employee has retained access, etc.

- **Proactive measures:** check settings, download updates, coordinate with personnel, etc.

Consequences: loss of data, public disclosure, extortion, damage to reputation, etc.

- **Reactive measures:** crisis communications policy, insurance, business continuity plan, etc.

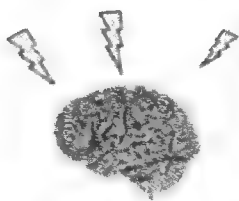
Structured Analytic Technique



Brainstorming

Purpose

To generate new ideas and concepts from a group using divergent-convergent thinking.



Description

Structured Brainstorming is a two-stage group activity that takes 60-90 minutes.

In the *divergent* stage, each participant writes his or her ideas on a sticky note. Throughout the session, the facilitator collects these. As he randomly places them a board in full view of everyone, he reads them aloud to the group.

In the *convergent* stage, these ideas are rearranged and clustered into key themes by the facilitator or designated members of the group.

Usage

Brainstorming is most beneficial at the start of a project.

Requirements

Ideally, participants should come from different backgrounds and hold different points of view. This stimulates discussion.

It can speed up the process if you prepare a briefing on the topic and distribute it beforehand or present it at the start of the session.

Ask the participants to focus on a topic or question that is neither too broad nor too narrow. Write it prominently at the front of the room.

Provide each participant with a pad of Post-it™ notes and a Sharpie™ marker.

Brief them on the process that you will follow (aims, objectives, stages, timings, breaks, etc.).

During the divergent stage, encourage participants to listen carefully and think creatively. They must suspend judgement, and resist the temptation to self-censor or be critical of others. No idea is too weird or wild! What looks crazy at first may become valuable later.

Expect a lull after the initial round of suggestions. Allow up to 5-10 minutes of "dead air" for people to reflect on what they have heard. Eventually, a second round of suggestions will begin.

During the convergent stage, it is typical for 40-60 suggestions to cluster into 5-8 themes. This often involves some debate. Be flexible.

Discuss outliers before eliminating them.

A trained facilitator can help ensure a fruitful session, especially with groups larger than 6 or 7 people. Setting the right tone is key.

Strengths

The group dynamic stimulates the imagination. One person's thoughts may trigger an idea for another person.

The divergent phase encourages spontaneity and exploration, while the convergent phase provides focus.

This method generates many ideas very quickly. It is an effective way to broaden your thinking.

Brainstorming is often used in conjunction with other SATs such as ACH, Red Cell, and SWOT.

Weaknesses

Office politics, poor group dynamics, participants with an agenda, or uninspired leadership could sabotage a fulsome session.

Some people need quiet time to reflect; they don't do well in group situations and can't think on their feet. One solution is to provide breaks or schedule the sessions a week apart.

Structured Analytic Technique



Chronologies and Timelines

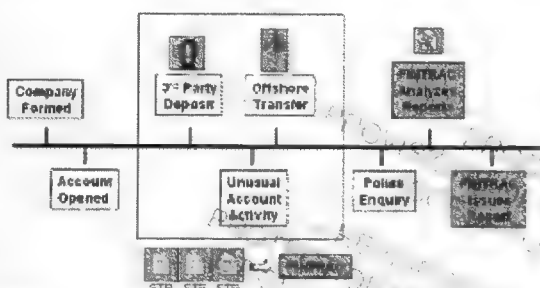
Purpose

To organize or display data by date and time.

Description

Chronologies list events in the order they occurred, usually in narrative or bulleted form.

Timelines arrange information graphically along a chronological spectrum.

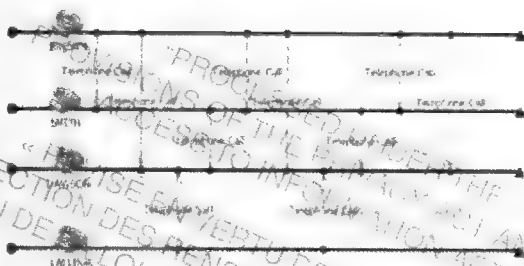


Usage

At the beginning of an investigation, a chronology of events or timeline can be useful to sorting the data.

During the analytic process, newly acquired data can be added to chronologies and timelines as events happen or when additional information comes to light.

This is also when they can reveal gaps, discrepancies, and patterns such as "command and control" structure.



Who is giving the orders?

In the final product, chronologies and time-lines are particularly useful for displaying the data for consumers.

Requirements

Ideally, the date and time must be known for each event. The data must then be sorted.

A chronology is usually a simple list of events, either in a table or as bullets.

Timelines usually proceed from left to right.

Software, such as Analysts Notebook, can be used to generate timelines. So can RFFlow and SmartDraw.

Strengths

Chronologies and timelines:

- help sort and manage data;
- may reveal relationships and patterns that aren't apparent in regular narrative text;
- make flows more explicit;
- discover gaps and generate requirements for additional research or investigation, and
- aid readers to understand.

In certain situations, a timeline can be a predictive tool. For example, knowing what stage an adversary is at in a process may provide an indication of when the process will be completed.

Weaknesses

Noticing a gap or discrepancy requires logic, common sense, or subject matter expertise, i.e. an intimate knowledge of the steps in a process.

It is difficult to notice the absence of evidence (the dog that didn't bark in the night).

Detecting patterns in data sets involving hundreds or thousands of events usually requires specialized software.

Structured Analytic Technique



Concept Maps

Purpose

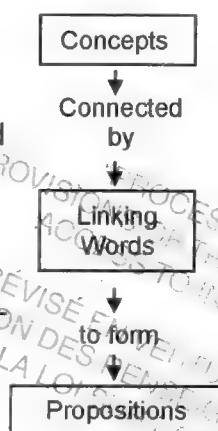
To visually represent knowledge with emphasis on the relationships between concepts.

Description

CMaps aim at developing new insights. The technique is primarily "Imaginative" although it is arguably also "Diagnostic".

CMapping is a way of knowledge diagramming.

A CMap is a network of linked nodes. Each node represents a concept. The relationship between two concepts is described on the directional link between them. This node-link-unit is called a proposition and is read in the direction specified by the arrow.



Both concepts and relationships require clear articulation if the propositions that comprise the map are also to be clear.

An entire CMap is intended to provide a comprehensive answer to its Focus Question.

Although similar to mind maps in some ways, Cmaps are networks, not strict hierarchies and include more than just one idea. In addition, through labeling of the links, CMaps allow many kinds of relationships to be expressed.

Usage

CMaps are most effectively used at the start of a research project to organise ideas and at the end of a project to validate the thinking process and identify any remaining gaps.

Requirements

CMaps may be constructed individually or collaboratively. The steps involved are:

- Formulate a Focus Question;
- Generate a list of relevant concepts;
- Begin connecting concepts with explicit linking words and add concepts to the structure;
- Periodically consider relevance of included concepts, relationships, and concept organization to the posed Focus Question;
- Consider addition of arrows and other concepts;
- Reposition and refine map structure and ensure that the map answers the Focus Question.

To see the above list as a CMap, visit [IHMC](#).

Strengths

CMaps stimulate creative insights; encourage non-linear thinking; clarify meanings; externalize and decompose knowledge; and promote relevancy by requiring that map elements collectively provide an answer to the Focus Question.

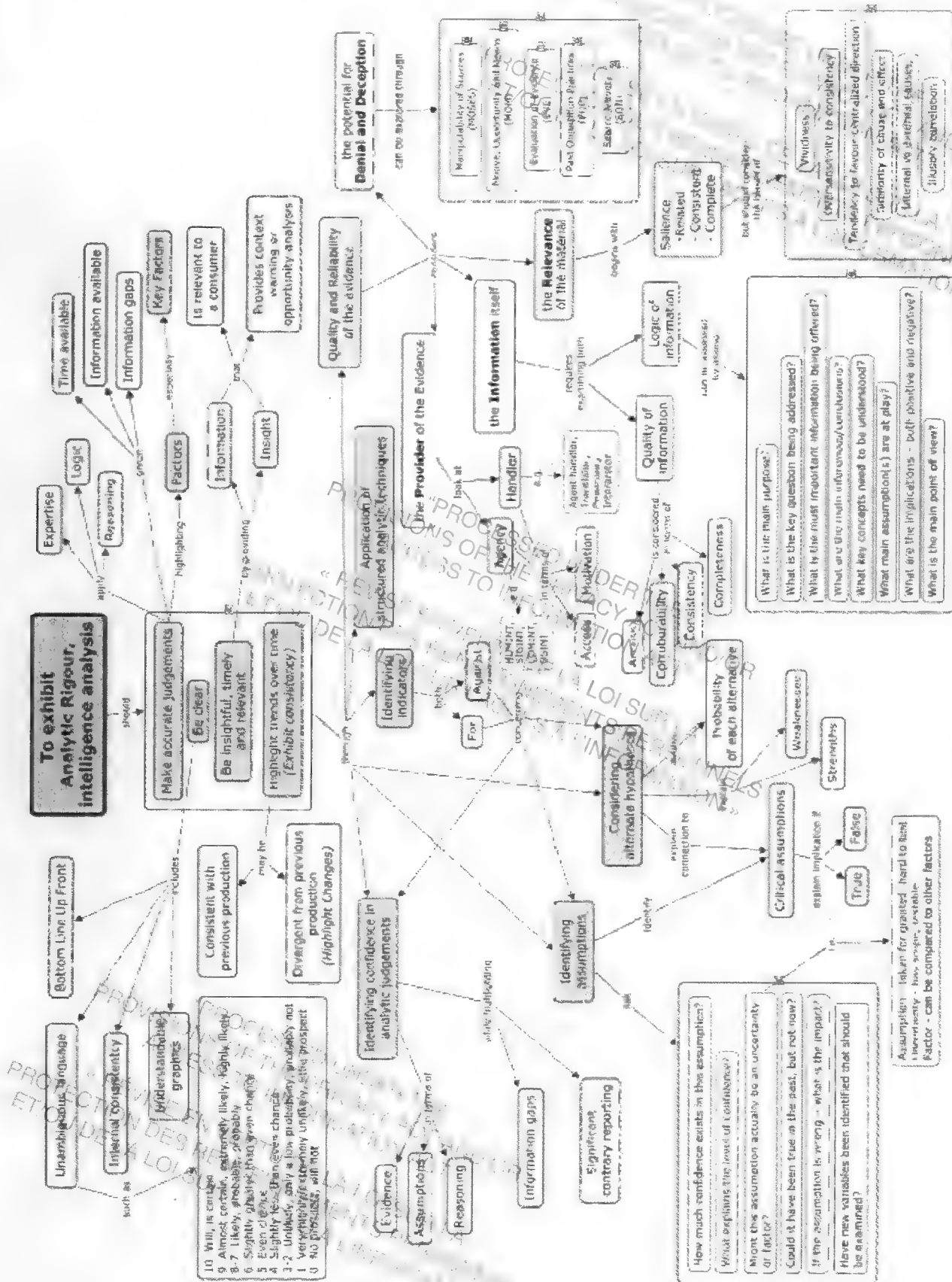
Most importantly for analysts, CMaps reveal gaps in knowledge and differences in understanding, thereby guiding research, promoting discussion and facilitating collaboration. Ultimately, they produce a better shared understanding.

Weaknesses

CMapping may not suit non-visual learners.

Further Information

- [CMapTools](#) – free software by IHMC.
- [The theory underlying concept maps and how to construct and use them](#). Novak, J. & Canas A.J.



Concept map on "Analytic Rigour" created by Gudmund Thompson, 2007.

Structured Analytic Technique



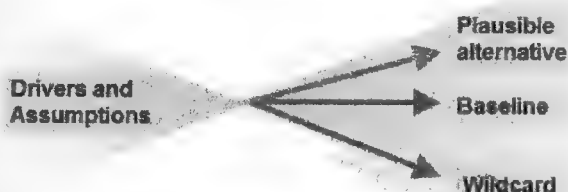
Cone of Plausibility

Purpose

To generate a small set of scenarios.

Description

The Cone of Plausibility is a scenario generation technique. It produces a set of plausible scenarios or "futures", typically three: baseline, plausible variation, and wildcard.



Steps:

- Choose the timeframe. How far into the future do you want to go? Weeks, months, or years?
- Identify the relevant drivers (at least 3 but no more than 5-7) that will shape events over the selected timeframe.
- Make assumptions about how each of these drivers will behave (one assumption per driver).
- Generate a **baseline scenario** (usually an extrapolation of the present day situation).
- Generate a **plausible variation** by changing the weakest assumption.
- Finally, create a **wildcard scenario** (one that would have high impact) by radically changing an assumption.

Usage

If done at the start of a project, this approach can shape collection efforts.

It can be used to test the impact of change.

The "scenarios" generated are useful for contingency planning.

Requirements

A good understanding of the subject matter is needed to select the relevant drivers and a good imagination helps in working through the impact of changes in assumptions.

Results are better as a group exercise.

Strengths

Greater simplicity and speed relative to other scenario generation techniques.

The technique encourages analysts to challenge conventional thinking.

It is fairly intuitive and commonly used, especially in the military. It does not require elaborate explanation.

The process easily translates into a written report. "We considered several drivers and made a number of assumptions to generate the following three possible scenarios."

It can sensitize analysts to the kinds of signposts and indicators they might see, if a given scenario was actually beginning to emerge. This makes the approach useful for identifying Indicators and Warnings (I&W), and ultimately providing customers with Strategic Early Warning.

Weaknesses

It oversimplifies the future. There could be more than three possible scenarios.

This technique is in the imaginative category; it generates scenarios. It isn't intended to be predictive; it doesn't assign probabilities.

Analysts need to be careful to present the results as future outcomes that are *plausible* under certain conditions, rather than as what *will* happen.

Structured Analytic Technique



Counterfactual Reasoning

Purpose

To force a more complete consideration of an outcome that is **conditional** on a previous event.

Description

Counterfactual reasoning poses a hypothetical "What if?" question. E.G. *If I were to buy a car, what would that car be?* Note that two events are mentioned (a decision, Event **A**, and a purchase, Event **B**). The idea is that **B** could be affected by how **A** comes about and by background factors affecting both **A** and **B**.

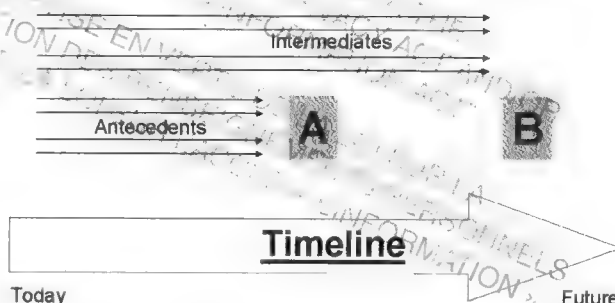
Usage

"What will **B** look like if **A** happens?"

If the problem can be put in these terms, use counterfactual reasoning to better understand precursors and potential outcomes.

1. Identify the possible ways that **A** could come about ("antecedent scenarios"). E.G. I might buy a new car because my old car broke down, I want the latest model, or my needs have changed.
2. Rank order these scenarios in terms of probability, i.e. Which is most likely?
3. Consider background events or factors ("intermediaries") that could affect **A** and **B**. E.G. Is my job secure? Do I have other major expenses? Is the car I want available?
4. Rank order these intermediaries in regard to their potential impact on **A** and **B**.
5. Identify possibilities ("consequent scenarios") for **B**. What are the options? E.G. I could buy a Mustang, Corvette, or Porsche.
6. Rank these scenarios. Which is most likely given the ways **A** could occur and background factors?

Graphically, the process looks like this:



Historians engage in counterfactual reasoning when they posit an alternate history, E.G. "What would the world look like today if Napoleon had won at Waterloo?"

Requirements

A good understanding of the context of the situation / problem and knowledge or related or historical examples vastly enriches the process.

Strengths

This technique prompts analysts to consider the many ways (and reasons) an event could occur.

It shifts attention from outcomes to the precursors and background factors that influence events.

Weaknesses

As with any hypothetical exercise, there is no guarantee of accuracy. Factors can be missed or mis-weighted.

The model created by this process is a simplification of reality. It may give analysts a false sense of confidence that they truly understand the dynamics of a complex problem.

Source: [Counterfactual Reasoning - A Basic Guide for Analysts, Strategists, and Decision Makers](#) (pdf) by Noel Hendrickson, Ph.D. with thanks to Gudmund Thompson.

Analysts Go Counterfactual

On April 9, 2010 analysts from CSIS, ITAC, DND-CDI, PCO-IAS, IDRC as well as Prof. Matteo Legrenzi from the University of Ottawa participated in an exercise organized by EDC's Political and Human Rights Risk Assessment Department (PHRAD) that used "Counterfactual Reasoning" to examine the impact that potential state failure in Yemen could have on the long-term political and economic stability of Saudi Arabia.

The exercise was coordinated by John Bitzen from EDC and facilitated by Gudmund Thompson from DND-CDI.

Why Counterfactual Reasoning?

Counterfactual Reasoning exercises provide analysts with a process for anticipating the likely causes and consequences of potential high impact future scenarios.

In the case of EDC, the goal was to understand what Saudi Arabia would look like if Yemen were to experience a complete collapse of central authority or state failure.

What was the process?

In every counterfactual reasoning exercise, participants first brainstorm and then rank, according to criteria agreed upon by the group, the antecedents that could bring about a potential high-impact "what-if" scenario.

For the group, this meant brainstorming developments that could bring about the collapse of the Yemeni state.

The key scenarios that were identified as being most likely to lead to state collapse in Yemen were a succession crisis; a successful rebellion by southern secessionists that challenges the ability of the Yemeni central government to control key oil-producing areas; and a major economic crisis that sparks social unrest.

Having identified a list of scenarios believed most likely to lead to potential state collapse in Yemen, the next phase of the exercise involved generating a list of "intermediate events" that are independent of the "what if" scenario but could still have consequences for the topic being analysed.

In the context of the exercise, this meant identifying factors that are unrelated to the scenario of state collapse in Yemen but would still influence Saudi Arabian stability. The discussion highlighted the price of oil and changes in US foreign policy in the Gulf region as two factors that would have the greatest potential impact on Saudi Arabia's political and economic stability.

After mapping out the scenarios most likely to lead to Yemeni state collapse, and with the intermediate factors likely to influence Saudi stability kept in mind, the group moved on to the final stage of the exercise: the consequence assessment.

The group's bottom line conclusion was that even a complete failure of the Yemeni state would be unlikely to have a significant impact on Saudi Arabia's economic and political stability. This conclusion was based mainly on the assessment that Saudi Arabia had the means and historical experience to counter any security threats that could arise from state failure in Yemen.

How useful was Counterfactual Reasoning?

The ultimate conclusion was not radically different from preliminary assessments but going through the exercise exposed everyone to a wider range of views and to challenge questions. It also prompted useful discussion about the concept of state failure and helped flag other scenarios unrelated to Yemen, such as a regional war involving Iran, that are likely to have a greater impact on Saudi Arabia's economy and security.

Reprinted with permission from the May 2010 edition of the Intelligence Analyst Training Newsletter.

Structured Analytic Technique

Cross Impact Analysis

Purpose

To highlight how factors inter-relate.

Description

It is typical for analysts to examine the factors or drivers of a situation in isolation. Analysts will systematically move from one factor to the next, thinking about how each one affects the eventual outcome. For example, poverty and lack of education both contribute to crime. However, many "variables" are not completely independent—their affect can strengthen or inhibit other variables. A lack of education, for example, makes poverty more likely. Cross Impact Analysis forces analysts to consider how the relationship between variables could affect the final result.

Usage

Cross Impact Analysis is useful in the early stages of a project. Once a brainstorming session has determined all the variables, drivers, or players that may influence the outcome of a situation, the next step is Cross Impact Analysis to systematically examine the relationships between each of the variables.

Use this technique whenever you need to know:

- how all the factors relate to and influence one another;
- stabilizing and destabilizing forces; or
- implications (2nd order and 3rd order effects).

Requirements

The basic steps to Cross Impact Analysis are:

- Identify the set of relevant variables.
- Create a matrix by listing these variables down the left side and across the top.
- Work across the first row. Ask "Does the presence of Variable 1 increase or decrease the influence of Variable 2, 3, 4, etc.?"

- Record the magnitude of this effect in the appropriate cell. If one variable is a catalyst, enabler, or force multiplier for another, use a plus sign ("+") to code the effect as "enhancing". Use a minus sign if the effect is "inhibiting" and NA if there is no effect.

For example, wealth and education correlate with less crime. The relationship between these variable is reflected in the matrix below by a plus sign (highlighted in red).

Neighbourhood Crime

	Wealth	Education	Gangs
Wealth		+	-
Education	++		NA
Gangs	NA	-	

Legend: NA means "no affect", + positive, ++ strong positive, - negative, -- strong negative

The relationship between variables is assessed twice, because it may not be symmetric.

Strengths

Finds the most influential variables and exposes variables that were thought to be independent as inter-related / interdependent.

May reveal where a confluence of events or factors create a "perfect storm", i.e. a combination of variables that reinforce one another (a positive feedback loop), leading to rapid change.

Provides a first step toward a Causal Loop Diagram and quantitative modelling.

Weaknesses

This technique can be time consuming if all possible interrelationships are explored. It also relies heavily on the opinions and knowledge of the analysts involved making it difficult to reproduce results.

- Structured Analytic Techniques by Pherson and Heuer has a chapter on Cross Impact Analysis,
- An Elementary Cross-Impact Model, RAND.

Structured Analytic Technique



Deception Detection

Purpose

To avoid manipulation by an adversary.

Description

Adversaries use Denial and Deception (D&D) to conceal their activities and intentions. It enhances effectiveness and enables surprise.

- **Denial** refers to blocking access to useful information.
- **Deception** refers to making the target believe something that is false.

D&D occurs at all levels. Tactical deception might involve leaking information that an attack will occur at a false time and place. Strategic deception is aimed at high-level decision makers. During the Cold War, for example, the US deliberately leaked documents to the Soviets about computer chips and military technology. The Soviets invested heavily only to find the technology was unworkable.

Usage

Analysts should look for deception whenever they are faced with a *sophisticated* adversary (i.e. one that knows your collection capabilities and the indicators you monitor).

Requirements

When deception is suspected, there are four questions to ask:

- 1) Does the adversary have the Motive, Opportunity and Means (MOM) to deceive?
 - **Motive** – How would deception benefit the adversary?
 - **Channels** – What means of deception are available to the adversary?
 - **Risks** – What are the risks to the adversary if the deception is discovered?

- **Costs** – Can deception be accomplished at a reasonable cost?
- **Feedback** – Can the adversary observe the effects of deception?

2) Would deception be consistent with Past Opposition Practices (POP)?

- Does the adversary have a history of deception?
- Does the observed activity fit a past pattern of deception? If not, are there other historical precedents?
- Have circumstances changed that would alter the form of deception?

3) Is the Manipulability of Sources (MOSES) a concern?

- Is the source of information reliable?
- Does the source truly have access?
- How good are the sources bona fides?
- Is the source vulnerable to control or manipulation by a foreign agent?

4) What can be learned from an Evaluation of Evidence (EVE)?

- How accurate has the source's reporting been?
- Is the whole chain of evidence available?
- Does critical evidence check out?
- Does any evidence conflict or corroborate?
- Is the absence of evidence unusual?

Strengths

Deception Detection adds rigour to analysis and reinforces the effectiveness of other analytic techniques.

Weaknesses

Deception is difficult to detect because it takes advantage of existing perceptions and biases.

Because it is time consuming, analysts seldom check for deception, even when there is a well-known history of its use.

Structured Analytic Technique



Decision Trees

Purpose

To establish chains of decisions and/or events which illustrate a comprehensive range of possible future actions.

Description

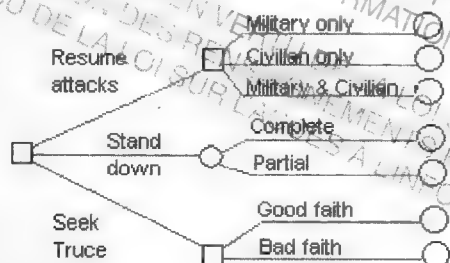
Decision trees are a way to chart the range of options for a given decision point, give estimates of value or probability for each option, and show possible outcomes.

Usage

1. To aid our own decision making by explicitly comparing options.
2. To create a heuristic model of our subjects' decision making.
3. To map multiple competing hypotheses about an array of possible actions.

A decision tree illustrates a comprehensive set of possible decisions and the possible outcomes of those decisions. It can then be used to help assess the probability that the subject will follow any given sequence of decisions.

A decision tree is structurally similar to critical path analysis and to programme evaluation and review technique (PERT) charts. However, both these techniques show only the activities and connections which need to be undertaken to complete a complex task. A timeline analysis as done in support of a criminal investigation is essentially a decision tree drawn after the fact, showing only the paths taken.



Requirements

Analysts producing a decision tree to model a subject's decision making need to have a rich understanding of the subjective and objective worlds of the subject(s), including: cultural norms and values, motives, operating doctrine, operational environment, sensitivity to risk, and other relevant factors.

Strengths

Decision trees are simple to understand and interpret. A decision tree can be generated by a group through brain-storming, and can also be posted up for addition & comment over a period of time. Both approaches can increase the completeness of the set of possible options and consequences.

Weaknesses

Relies on the accuracy of data used, completeness of the range of options assessed, and on the validity of the qualitative probabilities values estimated for each option.

A detailed decision tree can present the misleading impression that its authors have thought of all possible options and/or outcomes for the situation. In intelligence, there are often options available to the subjects which we did not imagine, just as there will be unintended consequences which the subjects did not foresee.

References

- Decision Tree Analysis by MindTools
- "Quantitative Approaches to Political Intelligence: The CIA Experience" by Richards J. Heuer, Jr. American Political Science Review, Vol. 73, No. 4 (Dec., 1979). pp. 1215-1216.

Structured Analytic Technique



Delphi Method

Purpose

To produce reliable consensus judgements from a large and diverse set of experts.

Description

The Delphi method is an iterative survey approach to generating consensus judgements. The progressive series of questionnaires is a structured, anonymous debate among the participants.

The first set of questionnaires is sent out to the panel of experts who provide their individual judgements.

The next set of questionnaires includes anonymous summaries of the responses to the previous questionnaire; the panel members are asked to consider these other responses and to revise or maintain their own judgements accordingly.

A reliable consensus of opinion usually develops in the second iteration, but the process can be repeated further if necessary.

Sometimes the survey will reveal stable disagreement in the form of two or more factions holding incompatible opinions.

Usage

The Delphi method can be used in predictive assessments, in priority setting assessments, and in generating expertise-based analytical tools.

Requirements

A successful Delphi depends on good survey design, sound analysis of the survey results, and on involving respondents with valid and relevant expertise.

Strengths

Studies of Delphi method have shown it to produce more reliable consensus judgements than face-to-face meetings.

A Delphi survey can also be more efficient and economical than arranging and facilitating a meeting / workshop of the appropriate experts.

Weaknesses

Errors in survey design, survey results analysis, or in selecting the participants can lead to invalid results.

The process can be laborious and time consuming.

Recommended Readings

- *Gazing into the Oracle: The Delphi Method and its Application to Social Policy and Public Health.* Jessica Kingsley Publishers: London. Michael Adler and Erio Ziglio, 1996.
- *Studies in the Quality of Life: Delphi and Decision-Making.* Lexington Books: Lexington, Mass. Norman Crolle Dalkey, 1972.
- *Delphi Method.* Wesley: Reading, Mass. Harold A. Linstone and Murray Turoff, 1975.

Structured Analytic Technique

Devil's Advocate

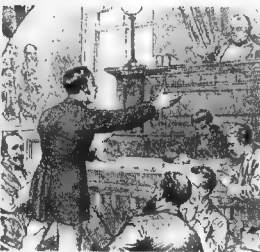
Purpose

To test an argument by attempting to prove it is flawed or fundamentally incorrect.

Description

People may not raise tough questions because they want to be a team player or lack self-confidence. However, as the official Devil's Advocate (DA) they have the public licence and the responsibility to be critical.

The Roman Catholic Church used to appoint an *advocatus diaboli* [Devil's Advocate] to argue against granting sainthood to a candidate.



Courts of law have used a structured confrontation between prosecution and defence for hundreds of years as a means of testing arguments.

Usage

This process is best used when a choice is required between two alternatives. Many use it to pre-test an argument or submission before it is formally presented for approval.

Use it to surface issues that might otherwise be ignored and ensure that issues, once raised, are addressed and not just glossed over.

Requirements

Whether critiquing a colleague one-on-one or playing the role at a meeting, always ask permission, "I'd like to explore this issue. Do you mind if I play Devil's Advocate?"

The best choice for a DA is a knowledgeable, but neutral party that can't be accused of bias.

A good Devil's Advocate goes beyond simply contradicting his or her opponent. They challenge both evidence and assumptions, advancing counter-arguments and alternative interpretations.

Advice for Devil's Advocates:

- Clarify your role. Substantive issues only? Inaccuracies? Spelling and grammar?
- Be careful of harping on the same issues; it creates "warning fatigue".
- Ask questions; don't make statements. "What would change your mind?"
- Be diplomatic. "What is the basis of your belief? Is there another interpretation?"
- Be assertive, but humble. "Could you rephrase that in simpler terms for me?"

Strengths

Finds flaws in a hypothesis or assessment which the author has missed. A paper that survives the process has more credibility.

Although the approach is confrontational, it can promote creativity and reduce "group think."

Weaknesses

Many issues don't have a simple 'yes' or 'no' answer. Both views may have merit. This approach may impose a false dichotomy.

An overly aggressive DA can cause bad feelings, recriminations, and obstinacy, especially in an emotionally charged atmosphere.

A DA can acquire a reputation as Dr. Doom; it may even be a Career Limiting Move.

A weak DA may create a misleading impression that all sides of an issue have been considered, when in reality they have not. This could lead to false confidence.

Related Techniques:

- **Team A / Team B** argues different (rather than just opposite) points of view
- **Dialectic Inquiry** goes beyond merely finding flaws.
- **Adversarial Collaboration** looks for areas of agreement.
- **Six Hats** forces everyone to play DA.

Structured Analytic Technique



Dialectic Inquiry

Purpose

To arrive at plausible alternative explanations through a guided discussion that challenges assumptions and evidence.

Description

Dialectic Inquiry is a method of examining and discussing opposing ideas in order to find the truth. It goes back to the ancient Asian idea that everything is made of opposites (*yin* and *yang*). The German philosopher Hegel expressed this in terms of *thesis*, *antithesis* and *synthesis*.

Dialectic Inquiry goes beyond merely finding flaws. Through constructive discussion, it attempts to produce plausible alternative analysis.

Usage

Dialectic Inquiry is often used to critique a draft paper. It can be done one-on-one with the author by a supervisor, peer, or a team.

The process guides the discussion with the goal of providing constructive feedback to the author. One version of the process has six steps:

1. identify the thesis or main points of the paper;
2. list all the evidence presented by the author;
3. list the assumptions necessary to support the thesis or main points of the paper;
4. list problems with the evidence (E.G. poor quality, alternate interpretation) and any unused, but relevant evidence that the author failed to consider;
5. list problems with the assumptions (E.G. weak, out-of-date) as well as missing assumptions; and
6. in light of the issues uncovered, re-examine the author's conclusions for weaknesses and flaws, propose solutions and alternatives.

Requirements

Dialectic Inquiry is a form of adversarial collaboration, like the Nosenko Approach.

- Yuriy Nosenko was a Soviet intelligence officer who defected to the US in 1964. Some thought he was legitimate; others thought he was a plant. Both sides were asked to list the evidence critical to their argument. Each side then addressed the composite list of 14 items in what became known as the "Wise Men" Report. The process led to a stronger belief that Nosenko was legitimate.

As such, analysts need to view the process of Dialectic Inquiry as a partnership, not a contest.

Results are much better with a team.

Strengths

This technique counters mindsets and bias through the critical, but collegial, examination of existing analytic positions.

The focus is on the argument, not the author. It depersonalizes the discussion.

Weaknesses

The process can be time consuming. To expedite the process, focus on the most substantive issues, E.G. the most *diagnostic* evidence and the *key* assumptions.

The technique stresses critical examination over group harmony.

Related Techniques

- **Key Assumptions Check** focuses on assumptions.
- **ACH and Nosenko Approach** focus on evidence.
- **Argument Mapping** exposes the structure of an argument.

Structured Analytic Technique



Force Field Analysis

Purpose

To highlight forces or key drivers influencing an issue or change.

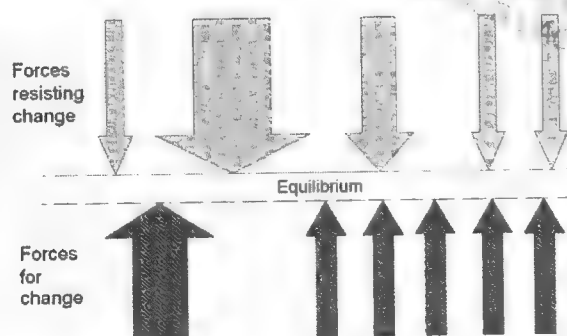
Description

Force Field Analysis investigates the balance of forces acting on issue or influencing a change. It attempts to identify the most important players and target-groups involved in the issue and their relative influence.

For a situation in flux such as a political crisis:

- Describe the existing situation.
- List all of the forces for change, and
- List all of the forces resisting change.

To simplify matters, think of forces that make matters either worse or better:



Scores or weights can be assigned to each force showing their relative strengths. This can be represented by thicker or thinner arrows.

Usage

If a change is contemplated, Force Field Analysis can help identify potential opponents and allies. At the onset of a study, it clarifies key drivers or forces. It also helps challenge assumptions about these drivers and highlights those that are stabilising or destabilising.

Requirements

The "exam question" must be clearly identified and understood by the study team before embarking on the identification of positive and negative forces.

Strengths

Force Field Analysis highlights core forces / drivers that influence or impact a situation. If presented visually, it is easy to see which factors merit attention. This helps determine the best way to influence a situation or outcome.

It prompts discussion over the relative impact different forces have on a given situation and may expose assumptions.

Speculating on changes to drivers helps generate alternative scenarios and possibilities.

It is useful for generating signposts and indicators. *"If this changes, we should see X."*

It is a precursor to Cross Impact Analysis.

Weaknesses

Analysts must have a good understanding of the relevant drivers and forces.

The weightings given to drivers are arbitrary and subjective. At most, one might say that one factor is twice as important as another.

The technique does not generate a specific "baseline" scenario. It does not predict what equilibrium might look like or when it might be achieved.

The "sustainability" of a driver is not addressed.

Not all forces are clearly negative or positive. Gray areas may not be adequately examined.

Further Reading

- A Force Field Analysis Worksheet and instructions are available at <http://www.mindtools.com/rs/ForceField>.

Structured Analytic Technique



Gantt Chart

Purpose

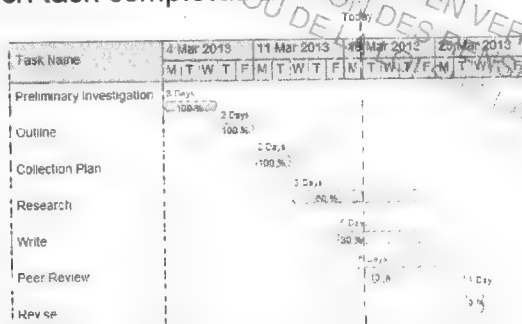
To visually depict the phases of a project.

Description

Gantt charts are a process map that show how phases of a project overlap and where one phase must finish before another can start. They create a work breakdown structure showing dependencies and milestones. They help identify when resources will be needed and measure progress toward the final goal.

Usage

Analysts could use a Gantt chart to show how they intended to research and write a very complex paper. This one shows the percentage of each task completed as of March 18th.



A Gantt chart could also depict the steps in bomb-making, planning an attack, or uranium enrichment. It would provide a best (or worst) case scenario for time until completion. If the resources needed for each stage were known and distinct, analysts could use this to argue the project had reached certain point.

Requirements

The basic steps to creating a Gantt chart are:

- Create a Task List of all planned activities.
- For each task, estimate the time it will take.
- Plot each task (using software or graph paper), showing whether the tasks/activities are parallel or sequential.

Software to create Gantt charts is abundant. All have similar features (see product [Comparison](#)). The dominant product is [Microsoft Project](#) (videos, [blog](#)). Two free alternatives are [ProjectLibre](#) and [GanttProject](#). To create a chart from Excel, try the [Vertex42 Template](#).

Charts can also be created collaboratively and online (Creatly has a free [Simple Gantt Chart Tool](#)).

Strengths

Gantt charts provide managers with a view of a project's status.

The can monitor the development of a new weapons system, preparations for military action, or the stages of self-radicalization.

They help identify when activities must start in order for a project to end on time, enabling better planning.

A Gantt chart can identify and describe the modus operandi of a criminal or terrorist group, including the preparatory steps they typically take before committing a crime or attack.

Weaknesses

When modeling the expected behavior of an adversary, there is always the danger of mirror imaging (expecting them to act like you). Your Gantt chart may not look like their Gantt chart. Although useful and valuable for small projects that fit on a single sheet or screen, Gantt charts can become quite unwieldy for projects with more than about 30 activities.

Gantt charts only convey time; they don't convey cost or difficulty. For example, Gantt charts depict work as constant. In practice, the workload (or effort) can vary during the task, e.g. it may be front-end or back-end loaded. A large number of dependencies may result in a cluttered or unreadable chart.

Structured Analytic Technique



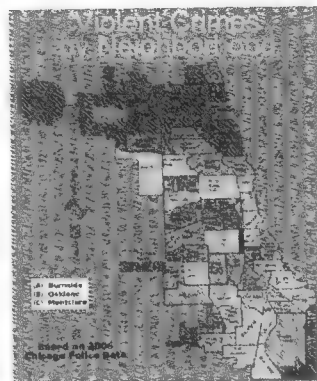
Heat Map

Purpose

To visually highlight or group items of interest.

Description

Similar to thermographic images from infrared cameras, heat maps depict hot-spots of activity using a colour scale.

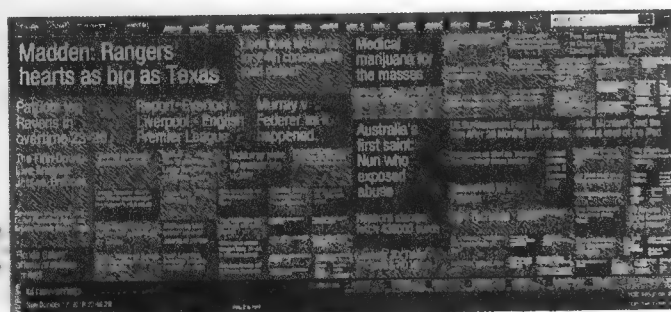


Usage

Heat maps communicate threat levels clearly and simply. They can also be used to show whether elements of a collection plan have been fulfilled.

A simple heat map translates statistical data into an easy-to-use graphic that helps users see things that aren't apparent otherwise.

More complex heat maps use colour and size to visualize complex data values and relationships. An area-based visualization like the Newsmap below is called a tree map.



It groups like stories together, colour codes them by topic (sports, business, national, etc.) then uses size to indicate how many news stories there are on this topic at any time. Users can re-configure the data and color gradient.

Requirements

Heat maps can be created manually by shading cells of a table in MSWord or Excel (How to Create a Heatmap in Excel). Ideally, however, software is used.

- Panopticon (\$)
- R Statistics (**free**) for statistical computing, but contains several functions to trace heat maps.
- Heat Map Explorer (\$)
- Heatmap Builder (**free**) is a standalone application in Visual C# using the .NET environment.
- iMapBuilder (\$99) is a Windows map software program that generates interactive heat maps in flash format.
- Google Docs (**free**) has a heat map gadget.
- Visual Fusion (\$) creates interactive, visual applications utilizing SharePoint (video).

Strengths

Provides quicker analysis, better decisions and more effective communication.

Rapidly identifies trouble spots, before they are out of control.

Ensures that attention and resources go where they bring the best return.

Discovers underlying trends that point to high-value opportunities.

Weaknesses

Depends upon the completeness, currency, consistency, and accuracy of source data.

Forces categorizations and groupings which may lack nuance (e.g. "pixelization").

Structured Analytic Technique

High Impact – Low Probability

Purpose

To provide early warning that a seemingly unlikely event, that would have major consequences, might actually occur.

Description

The conventional view may be that an adversary cannot militarize anthrax because it is too complicated. High Impact – Low Probability analysis would question this view. It is a "contrarian technique".

It typically begins by identifying a potential event then attempting to put the impact of such an event in context. If this reveals the consequences of the event are severe, this triggers further examination of how such an event might come about, possibly revealing that it is not as unlikely as first thought.

An adversary, for example, may devise an alternative means for militarizing anthrax. They may improvise, skip steps, and take more risks, ending up with a crude, but effective product.

Usage

High Impact – Low Probability analysis is advisable when analysts and policy makers are convinced that an event is unlikely but have not given much thought to the consequences of its occurrence. In essence, it is a warning about an unexpected but not impossible event.

Requirements

The steps involved in this type of analysis are:

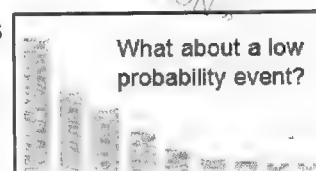
- Clearly describe the unlikely event.
- Define the outcome of the event (consider primary and secondary impacts). This will justify examining what others see as unlikely.
- Identify indicators that the event may occur.
- Postulate triggers for the event. What catalysts would accelerate things?

- Develop one or more plausible pathways for this unlikely event to unfold.
- Generate a list of indicators or signposts for these alternative pathways.
- Identify factors that could deflect this bad outcome or encourage a positive one.

Review and update the above as necessary.

Strengths

This approach counters the natural tendency to focus attention on only the most probable scenarios.



It gives analysts licence to explore the consequences of an event – particularly one deemed not likely by conventional wisdom – without having to challenge the main-line judgement or to argue with others about how likely an event is to happen.

Mapping out the course of an unlikely, yet plausible, event can uncover hidden relationships between key factors and assumptions; it also can alert analysts to oversights in the mainstream analytic line. Lastly it could reveal signposts to monitor for a shift in the situation.

Weaknesses

The evidence for low probability events is usually difficult to find and ambiguous.

Not everyone has the requisite imagination.

Convincing decision makers that they should consider a remote possibility for which there is currently weak evidence requires:

- an authoritative or credible author;
- plausible arguments with compelling scenarios and
- an open-minded audience receptive to unconventional ideas.

If the low-probability event is several years in the future, don't expect anyone to take immediate action. Hope instead for permission to monitor the issue.

Structured Analytic Technique



Indicators and Warning (I&W)

Purpose

Helps track events, monitor targets, spot emerging trends, and warn of change.

Description

An analyst or team creates a list of indicators or signposts of events that could be expected to be observed if a certain situation were to develop.

Economists, for example, monitor "leading indicators" to know if the economy is improving.

This list of indicators could be based on a review of similar events in the past or it could be entirely hypothetical ("If this were to happen, we would expect to see...").

Usage

I&W typically begins with a concern over possible future event, say North Korea launching a missile. Next, analysts break-down all the steps that would be required prior to the event. Then they would identify those steps that might generate observable phenomena. Lastly, they would task collection assets to monitor for these phenomena.

In a more complicated situation, I&W could help determine which one of several possible futures is emerging. This involves:

- identifying a set of competing scenarios (possibly via an SAT such as Alternative Futures Analysis)
- creating separate lists of potential activities, statements, or events (signposts) expected for each scenario
- watching for these signposts; and
- identifying a specific developing scenario, based the signposts observed.

Requirements

This technique works best when analysts have good knowledge of the process that is typically followed, E.G. the steps in launching a missile.

The indicators and signposts must be observable.

Strengths

Anticipating warning signs makes analysts quicker to recognize emerging threats and opportunities.

Indicators instill rigor into the analytic process by providing a basis for judgements.

Listing indicators makes the analytic process more transparent and gives readers a better sense of how far something has progressed.

Weaknesses

Analysts can become fixated on watching for the identified indicators, missing signals or developments that are not anticipated. The Yom Kippur War of 1973 is a good example. Israel did not see what it expected, hence was surprised when Arab forces attacked.

The best indicators are often very expensive or difficult to observe.

The adversary can use Denial and Deception (D&D) to obfuscate and confuse.

I&W does not work well on an adversary that does not follow protocol or doctrine, e.g. insurgents.

Indicators need to be validated and periodically updated (see SAT Indicators Validator).

Indicators can be misapplied to areas or situations where they are less reliable, E.G. US indicators may not apply in Canada.

Structured Analytic Technique



Indicators Validator

Purpose

To determine the strength (reliability) of an indicator.

Description

Not all indicators are created equal; some are better than others. The best indicators are *consistently* present *when and only when* the anticipated event is about to take place. This technique orders a set of indicators according to their value in reliably preceding an event or highlighting a situation, person, or issue of interest.

Usage

Monitoring the wrong indicators can be expensive, time consuming and lead to "false positives". Whether the indicators relate to possible money laundering or an enemy's intentions to attack, this technique helps focus attention and rationalize efforts.

Requirements

Begin with simple grid or matrix. Down the side, in rows, list the set of indicators currently used to detect or monitor a given activity or anticipate an event. Across the top, in columns, list the activity or event of interest followed by similar or related activities or events.

Now, assess for each cell of the matrix, whether the indicator is:

- Highly likely to appear (HL)
- Likely to appear (L)
- Could appear (C)
- Unlikely to appear (U)
- Highly unlikely to appear (HU)

The most "discriminating" indicator is Highly Likely to emerge in one scenario and Highly Unlikely to emerge in any other scenario. The least discriminating indicator is Likely or Highly Likely to appear in all scenarios.

Which indicator is best for determining if someone is concealing criminal proceeds?

		SCENARIOS / HYPOTHESES		
		Criminal activity	Hiding money from business partners	Distrust of banks
INDICATORS	Makes large cash deposits	HL	C	HU
	Sends money abroad	HL	HL	HU
	Makes unusual deposits and withdrawals	L	C	U
	Moves money in and out of account rapidly	L	C	U
	Refuses to answer questions	L	L	HL

The best indicator would be HL in the first column; and HU in all others. In this case, "large cash deposits" is the best choice.

Pressed for time? Don't bother with multiple scenarios, assemble a list of all known indicators for the activity in question, determine how frequently each indicator has been observed, and rank order the indicators by frequency.

Strengths

Focuses attention and rationalizes efforts.

Weaknesses

This technique can only identify the best indicator(s) in a given set. If these indicators were developed from relatively few instances or events, their reliability is inherently suspect.

This technique does not generate indicators.

Indicators (even validated ones) become less reliable as they move further away (temporally and geographically) from the activity or events upon which they are based.

Source: Based on Indicators Validator, Pherson and Associates LLC.

Structured Analytic Technique

Issue Redefinition

Purpose

To clarify the needs of a client.

Description

"It's a nice paper, but not what I needed."

These words signal a disconnect between analyst and client. Was the client unclear or did the analyst misunderstand the tasking?

To avoid this problem, analysts should interview their client, exploring the following six areas.

The Question—What does the client really want to know? What answer would satisfy them? Why is this important to them? How will they use your analysis? How does the client respond when you:

- Broaden the focus
- Narrow the focus
- Redirect the focus
- Turn things 180 degrees

Level of Analysis—How much does the client want to read, a two-page overview or a 40-page in-depth study? Raw, summarized, or assessed?

Time Frame—Is a quick (80 percent) answer in three days more important than a full answer in two weeks?

Information Sources—Does the client have any suggestions or preferences? What does the client think of your ideas?

Presentation Elements—Should the final product include statistics, charts, images, appendices, etc.?

Delivery Mechanism—Does the client want a hard copy or an electronic file? A verbal briefing? PowerPoint?

Usage

Issue redefinition is worthwhile whenever the stakes are high and mistakes are expensive.

Requirements

It may be productive to categorize the problem. (see Taxonomy of Problem Types). You could also think about whether the question is closed or open, set in the present or the future.

- Closed questions have a definite answer.
- Open questions require going beyond the data.

	Present	Future
Closed	Can be answered by "yes" or "no". E.G. Does Syria have a CBW program?	The answer depends on understanding how an individual, organization or system is likely to behave. E.G. How much Sarin will Syria have by 2020?
	There are a range of possible explanations. E.G. Why does Syria feel it needs CBW?	These are questions about future hypothetical possibilities. E.G. How would Syria react to US pressure to destroy its CBW stockpiles?

Source: UK PHIA Analyst Guidance Note, 2011

Strengths

Saves time and money.

Provides an opportunity to educate your client on the depth and range of your capabilities or alert them that the question is outside your area of expertise.

Weaknesses

Clients often don't have the time or inclination to answer all or an analyst's questions.

Anxious to please and under tight deadlines, analysts may curtail this process and commence researching and writing prematurely.

Taxonomy of Problem Types

Characteristics	Problem Types				
	Simplistic	Deterministic	Moderately Random	Severely Random	Indeterminate
What is the question?	Obtain information	How much? How many?	Identify and rank all outcomes	Identify outcomes in unbounded situation	Predict future events/situations
Role of facts	Highest	High	Moderate	Low	Lowest
Role of judgment	Lowest	Low	Moderate	High	Highest
Analytical task	Find information	Find/create formula	Generate all outcomes	Define potential outcomes	Define futures factors
Analytical method	Search sources	Match data to formula	Decision theory; utility analysis	Role playing and gaming	Analyze models and scenarios
Analytical instrument	Matching	Mathematical formula	Influence diagram, utility, probability	Subjective evaluation of outcomes	Use of experts
Analytic output	Fact	Specific value or number	Weighted alternative outcomes	Plausible outcomes	Elaboration on expected future
Probability of error	Lowest	Very low	Dependent on data quality	High to very high	Highest
Follow-up task	None	None	Monitor for change	Repeated testing to determine true state	Exhaustive learning

Source: Joint Military Intelligence College, 1991

Structured Analytic Technique



Key Assumptions Check

Purpose

To expose and validate the key assumptions on which fundamental judgements rest.

Description

Identifying hidden assumptions can be one of the most difficult challenges an analyst faces, as they are ideas held – often unconsciously – to be true and, therefore, are seldom examined and almost never challenged.

A Key Assumptions Check is useful at any point in the analytic process. If done early, it helps identify collection gaps. Midway, it may generate alternative hypotheses. At the end, it exposes weaknesses in key judgements.

Usage

First, the analyst writes down their theory of the case or hypothesis. *"I believe ..."*

Next, the analyst provides supporting evidence. *"My belief is based on..."*

Finally, the analyst goes through a 5-step process to examine key assumptions. This is best done in a group.

Identify

- What must be assumed to be true for the hypothesis to be true?

Limit

- Are circumstances forcing too many assumptions?
- Is there a way to reduce or eliminate any assumptions?

Check

- Why "must" each assumption be true?
- Could this assumption have been true in the past, but not now?
- Are there conditions or circumstances when these assumptions might not hold?

- Are the assumptions consistent with each other? If they are not, is there a reasonable explanation?
- How much confidence exists that this assumption is correct? Would others agree?
- What explains the degree of confidence in this assumption? Is the situation familiar or well-studied? Is the evidence compelling? Is just "common sense"?

Assess

- Which assumptions matter most?
- Ask *"If this assumption is wrong, what impact does it have on the analysis?"*

Revise

- Re-assess and revise assumptions as new information arrives.

It is highly likely that this process will identify factors that need follow-up. Analysts may also decide to explicitly state key assumptions to readers, alerting them to limitations in the analysis.

Requirements

A willingness to probe the basis of (cherished and long-held) beliefs.

Strengths

Explicitly identifying assumptions helps:

- Explain the logic of the analytic argument and expose faulty logic.
- Understand the key factors that shape an issue. Stimulate thinking about an issue.
- Uncover hidden relationships and links between key factors.
- Identify developments that would cause an assumption to be abandoned.
- Prepare analysts for changing circumstances that could surprise them.

Weaknesses

It is difficult to know when to stop.

Poor Assumptions: The Root of Most Intelligence Failures

An assumption is something that is taken for granted (without proof). We make hundreds of assumptions every day. They simplify our world, freeing our mind to focus on other matters.

On occasion, however, poor assumptions have had disastrous consequences.

- In 1963, the CIA was watching Cuba very carefully. They assumed that the Soviets would never risk such a provocative move as placing missiles so close to the US.
- In 1979, the CIA assumed that the Shah of Iran, one of the world's most powerful monarchs, could not be overthrown. They were completely caught off guard by the Iranian revolution.
- In 2003, it was assumed that Saddam Hussein still had weapons of mass destruction. That led many analysts to misinterpret the trace evidence that they were seeing as evidence of an ongoing program.

Should I alert my readers to my assumptions?

Just as you should alert readers whenever a key piece of evidence is suspect, you should alert them whenever you make a significant assumption (i.e. one that, if incorrect, would have significant impact on your conclusion).

E.G. "This paper *assumes* that the military will continue to support the government in power. On this basis we conclude that"

How can I alert my readers to my assumptions?

One option is to create a box listing 3 to 5 key assumptions. This prominent display warns readers that the paper's Key Judgements could be seriously affected should these assumptions prove invalid.

Molvania: Situation Worsening

Key Points

- Cease fire
- Widespread government corruption
- Food shortages

Recent Events

This text is merely a place holder to show that a paragraph would normally be here.
This text is merely a place holder to show that a paragraph would normally be here.

Background

This text is merely a place holder to show that a paragraph would normally be here.
This text is merely a place holder to show that a paragraph would normally be here.
This text is merely a place holder to show that a paragraph would normally be here.

Implications

This text is merely a place holder to show that a paragraph would normally be here. This text is merely a place holder to show that a paragraph would normally be here.

Key Assumptions

- Senior army officers continue to have low morale
- Naval blockade continues to prevent arrival of foreign aid
- Opposition forces continue to sabotage rail lines.

Assessment Base

This report is based on a single human source.

Another option is to mention them in the body of the document. Here are some suggestions.

- Our calculations are based on known factors, but assume that
- We have also assumed
- All of these timelines assume that
- On the assumption that
- These timelines depend on a large number of assumptions
- If our assumption is incorrect
- A second set of assumptions surround the
- We do not have a full intelligence picture therefore we assume the following

Not only do these statements alert the reader to problems and limitations, they show that careful thought lies behind the paper.

Structured Analytic Technique



Linchpin Analysis

Purpose

To manage substantive uncertainty when developing predictive assessments.

Description

Linchpin analysis structures a predictive problem through defining the factors which drive and influence the outcome of a situation.

These factors are:

- Drivers - key variables and unknown factors which are most likely to determine the outcome of a complex situation
- Linchpins - working assumptions which connect the drivers; there is usually greater uncertainty about linchpins than about drivers
- Triggers - plausible developments which could disrupt the linchpins holding the argument together
- Signposts - indicators that the judgement needs revision.

Linchpin Analysis was adopted in the CIA under Deputy Director of Intelligence, Doug MacEachin, in the early 1990s. He wanted structured argumentation that used non-academic terms so "key variables" became drivers and "hypotheses" concerning drivers became linchpins.

Usage

Linchpin analysis is used in forecasting / predictive analysis.

Requirements

Accurate judgement by analysts in selecting and defining the drivers, linchpins and other factors. Collection of accurate information relevant to the drivers, linchpins, and other factors.

Strengths

Provides a reliable approach to predictive analysis. Because linchpin analysis requires analysts to state their assumptions about the factors driving upcoming events, it also provides a structure for review and revision of those assumptions and hypotheses. By considering alternative drivers and linchpins, analysts can generate a set of multiple plausible future developments with corresponding indicators.

Weaknesses

Errors in selecting and defining the analytic factors will lead to flawed forecasting. This stage in the analysis is particularly vulnerable to cognitive biases such as mirror imaging.

Recommended Readings

- Articulation of Assumptions, Note 3 in *A Compendium of Analytic Tradecraft Notes*, Central Intelligence Agency, Directorate of Intelligence. Jack Davis, 1997.
- Improving CIA Analytic Performance: Strategic Warning, The Sherman Kent Center for Intelligence Analysis, Occasional Papers: Volume 1, Number 1. Jack Davis, 2002.
- Psychology of Intelligence Analysis, Center for the Study of Intelligence, Central Intelligence Agency. Richards J. Heuer, Jr. 1999.

Structured Analytic Technique



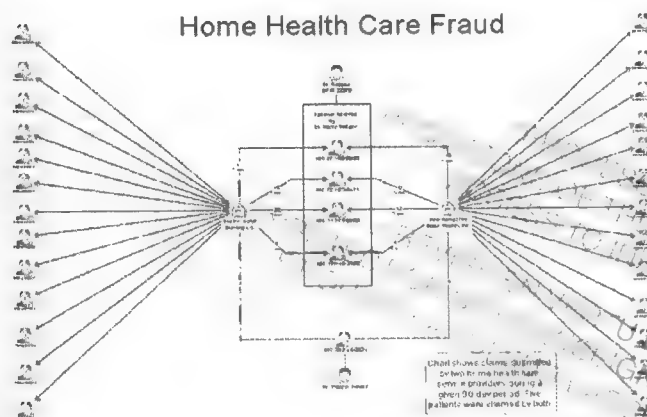
Link Diagrams

Purpose

To graphically depict relationship data.

Description

Link diagrams aid investigators and analysts by uncovering, interpreting, and displaying complex information in easily-understood chart form. They show the associations ("links") between people and organizations ("entities").



Usage

Consider using a link chart whenever it is important to:

- integrate data from different sources;
- highlight key relationships;
- provide a visual briefing aid for team members, prosecutors and juries; or
- show when cases overlap.

Requirements

For clarity and ease-of-interpretation, most charts:

- show organizations as boxes and people as circles;
- place individuals within their organizations;

- link individuals and organizations with lines (solid for confirmed links, dotted or dashed for suspected links)
- use coloured links to represent phone calls, financial transactions, commodity flows, etc.
- avoid crossing lines;
- place key entities in the centre, and
- include a legend or key especially if the chart will be used by people who are unfamiliar with such products.

Some analysts prefer to create an *Association Matrix*, prior to creating a link chart.



Software such as Analysts Notebook (\$) or Sentinel Visualizer (\$) feature the use of "icons", the ability to make changes easily, and to embed extra information. RFFlow (\$) is a cheaper but less capable program.

Strengths

Link charts are a concise way to tell a simple story but even with massive cases involving hundreds or thousands of entities they can help analysts find key relationships.

A link diagram is an excellent tool for examining call patterns and financial transactions.

Some software feature Social Network Analysis (SNA) metrics such as "degree centrality" for finding key players.

Weaknesses

Special care must be taken not to overstate relationships. Drawing a solid line between two people or between a person and an organization implies a confirmed connection.

Also, analysts should interpret SNA metrics with caution. An individual may appear to be very central, but the dataset may not be complete, skewing the results.

Structured Analytic Techniques



Mind Maps

Purpose

To improve critical and creative thinking by depicting relationships visually.

Description

Analysts often start collecting information without sufficient consideration of the problem or question they are facing. Whether what is needed is a *conceptual framework* or a *collection plan*, a mind map can better illuminate the path ahead.

How to Create a Mind Map
Adapted from Head First by Tony Buzan

1. Write your topic in the centre of a large piece of paper.
2. From the central topic, radiate out key words and the most important ideas you have about the topic, each on a separate, thick line.
3. Branch thinner lines off the ends of the appropriate main lines, to show supporting data (the more important the data, the closer it should be to the central topic or idea).
4. Use images and colors freely in your own special code to show people, topics, themes, associations or dates, and to make the Mind Map more memorable.

For examples, see sample mind-maps.

Usage

Mind maps are well suited to brainstorming because they don't impose linear thought (like a hierarchical "table of contents" approach does). One thought often spawns another, sometimes connecting things in unexpected ways.

Requirements

Mind maps can be created by hand using pencil and paper, on the web (Comapping, Mindomo, MindMeister, and bubbl.us), or with software (ConceptDraw, FreeMind, TopicScape, iMindMap, PersonalBrain, or MindManager).

Strengths

Mind maps are simple to create. They are intuitive, reflecting the way you think.

They visually capture, organize and communicate ideas and information effectively.

Users have greater retention and recall over traditional text-based approaches.

They provide a single view of all the aspects of a project. Lots of information can be taken in at a glance.

Weaknesses

Mind maps are not usually appropriate for formal presentations.

Recommended Readings

- Web 2.0 and the Intelligence Community (blog)
- OneBigWeb (blog)
- Mind Mapping Software (blog)
- Mind-Mapping.org (blog)
- Mind map (Wikipedia)
- A primer on mind mapping (blog)
- Concept maps (Wikipedia)

Structured Analytic Technique



Outside-In Thinking

Purpose

To identify the effect of external forces, factors, and trends that indirectly shape an issue.

Description

Analysis involves understanding the interaction of variables, usually within a simplified model of reality. Some variables are "endogenous"; they are affected by other variables within a model. Other variables are "exogenous"; they are influenced by external forces. Understanding the impact of external forces on these endogenous variables is the goal of Outside-In Thinking.

This technique provokes the analyst to consider the broader context, countering the natural tendency to *zoom-in* rather than *zoom-out*.

Usage

This technique works best at the beginning of a project as it helps to identify all the critical, external factors that need to be researched.

Requirements

To list the key external factors that could have an impact on the topic/question, analysts need to think broadly and creatively.

- For geo-political matters, consider Social, Technical, Economic, Environmental, and Political factors (the STEEP model).
- For business processes consider Suppliers, Inputs, Process, Outputs, and Customers (SIPOC) or Strengths, Weaknesses, Opportunities, and Threats (SWOT).

Next, analysts assess how each of these factors could affect the topic.

Finally, they research the impact these factors actually have on the particular issue.

Strengths

Determining how external changes/forces might, over time, profoundly affect a situation/issue, provides a wider conceptual and contextual framework. This may uncover additional factors, an important dynamic, or a relevant alternative hypothesis.

Outside-In Thinking reduces the risk of missing important variables (especially if the process is guided by a mnemonic like STEEP or SIPOC).

Weaknesses

At the outset, it is difficult to know how much impact external events/factors might have so it is hard to gauge how much effort is justifiable. The total cumulative impact could be negligible.

The number of variables could become unmanageable. Casting the net broadly also means shifting through a lot of irrelevant material. It can be difficult to determine what to keep and what to throw away.

This is a difficult technique without a team since it requires broad knowledge.

Example: House Prices

Let's say you were analyzing house prices. Key variables might be location, number of bedrooms, age, etc.

While all these variables have direct impact, there are other variables such as population, interest rates, and demographics that have indirect impact.

If more people move into the city, the demand for housing goes up, followed by house prices.

The increase in demand is the "rising tide that floats all boats". This exogenous variable could be the most important factor in determining whether house prices are going to rise or not.

Structured Analytic Technique



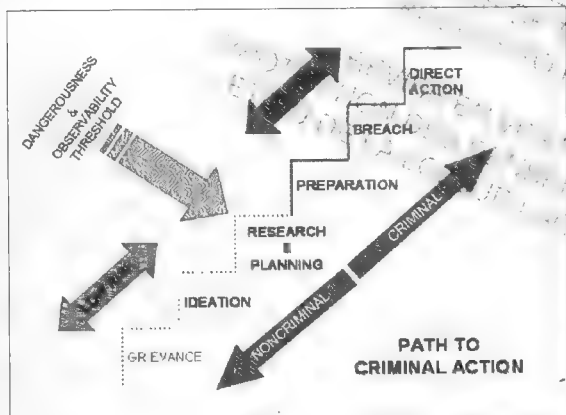
Path to Violence

Purpose

To assess the threats and risks posed to public order by groups and organized crime and to help guide operational decision making and resource allocation.

Description

The "Path to Violence" model by Calhoun and Weston (2003) postulates an ascending scale of six observable steps – the "continuum of intent" – which ultimately culminates in violent activity. Individuals or groups may move up or down the ladder – toward or away from taking *direct action*.



Usage

This methodology can be used to assess an individual or group's propensity to commit violent acts. It was used by the Joint Intelligence Group during the 2010 Olympic Games in Vancouver to anticipate criminal activity.

Requirements

Assess the stage of the individual or group.

GRIEVANCE: Subject exhibits anger, jealousy, sense of injustice or loss and a desire for purpose, status, revenge or recognition. This is usually a result of being aggravated or wronged in some way.

IDEATION: Subject considers violence (including criminal action) a justifiable option.

RESEARCH AND PLANNING: Subject determines how to execute the attack. Typical signs include information gathering, target research, suspicious inquiries, and target surveillance. Those who engage in "stealth behaviors" are more likely to commit violence than those who complain (drawing attention to themselves).

PREPARATION: Subject acquires weapons, training, transportation and equipment. Chooses clothing (disguise). Performs religious rituals. Writes to family members. Shoots martyr video.

BREACH: Subject tests security. Conducts dry run.

DIRECT ACTION: Subject commits violent attack.

Strengths

Communicates threat levels clearly and simply.

Focuses on observable actions and behaviours to provide good insight into motive and intent, avoiding contentious issues related to psycho-social, religious, race or ethnicity-based profiling assumptions and focuses on criminal-related behaviors.

Weaknesses

Depends upon the completeness, currency and accuracy of information.

Variations over time and between individuals and groups introduce uncertainty.

The model does not predict how quickly the subject will pass from one step to the next.

Indicators (for each step) can be subject to interpretation and may be ambiguous.

References

- Contemporary Threat Management - A Practical Guide for Identifying, Assessing, and Managing Individuals of Violent Intent, Calhoun & Weston, 2003. Study course
- The Path to Terrorist Violence: A Threat Assessment Model for Radical Groups at Risk of Escalation to Acts of Terrorism, Dean T. Olson, 2005.
- Threat Assessment and Management Strategies: Identifying the Howlers and Hunters by Calhoun & Weston

Path to Violence: Case Study

The Vancouver 2010 Joint Intelligence Group (JIG) used Calhoun and Weston's (2003) framework, *The Path to Violence*, as a predictive assessment tool to identify radical or criminal groups at risk of escalation to acts of violence.

To meet the unique needs of the JIG, some modifications were made to the framework.

- **Stage Indicators** were developed relevant to protest groups. At the "Ideation" stage, for example, the fact that a group is considering criminal action as an option may be evident in their discussions, Internet postings, media releases, statements, and propaganda.
- Each of the six stages was **colour-coded**. This clearly communicated to JIG clients where a group was within the continuum of intent.

Results

The *Path the Violence* was found to be well-suited to assessments and situation reports. By identifying precursor activities indicative of plots to commit criminal acts, it permitted the JIG to assess radical groups and individuals and gave authorities the opportunity to be proactive and disrupt conspiracies.

However, the methodology is not without its weaknesses. The risk posed by a group can easily change depending on their mood and circumstances. The JIG found that many groups and individuals remained in flux between the *Grievance* and *Ideation* stages where others reached the *Breach* stage only to return to the *Research and Planning* stage.

Groups can also stop their advancement along the Path for a number of reasons such as the loss of critical mass necessary to commit the crime, alienation of allied groups, arrest of key members, or by pressure from law enforcement efforts.

The methodology acknowledges that a group / perpetrator can move in either direction along the path. It also acknowledges that traversing the path may take months, even years, or it can be covered in hours, even minutes. This is an area that requires further research to be of greater use to law enforcement.

CASE STUDY

Group X is an umbrella organization, uniting representatives from various activist groups to mobilize against the Games. It operates as a leaderless collective, meeting regularly to discuss resistance efforts and encourages other anti-Olympic organizations to participate in its movement. The group has participated in workshops against Olympic sponsors. Criminal acts - including assault and vandalism - have been committed by group members.

Analysis

Group X is at the IDEATION stage. While criminal acts have been committed, these were neither planned nor endorsed by the collective.

Group X is now collaborating with other activist groups, both nationally and internationally. They are also participating in local events to garner support and funding for their cause. Plans to disrupt the Games are advancing.

Analysis

Group X is now at the RESEARCH AND PLANNING stage. They are expanding their network and influence.

Group X is now the dominant organizing body for anti-Olympic resistance. They encourage protest and endorse criminal direct action tactics. They have attempted to bypass security at an Olympic venue and committed acts of vandalism against local businesses and Olympic Sponsors.

Analysis

Group X is at the DIRECT ACTION stage.

Structured Analytic Technique



Peer Review

Purpose

To solicit constructive criticism and determine a paper's suitability for publication.

Description

Peer review involves getting verbal or written feedback from colleagues. The process can be formal or informal.

Usage

Analysts circulating a paper for peer review should inform their colleagues of the purpose of the paper and the intended audience. They should ask for help where they feel the paper is weak. They may also wish to solicit the views of non-experts as they may question what others take for granted.

Reviewers clarify, challenge, and suggest. Comments should be tempered by the cultural context and the organizational dynamic.

Maintain a positive, respectful relationship.

See the positive as well as the negative.

Make comments in the form of questions.

- "Do you mean that ..."
- "Is there another interpretation?"
- "Are you implying that ..."
- "Might some readers overlook this point?"

Invite a collaborative discussion rather than offer advice.

- "What are the pros and cons of moving these sections?"
- "How sure are we that ..."

Don't overload the other person with feedback.

Ask where your efforts are most needed.

- "How can I help? Am I checking for errors and omissions, argumentation, or citations and references?"

Requirements

A successful peer review process requires peers with the time, inclination, and expertise to provide quality feedback. The author must also be open to new ideas and criticism.

A checklist or feedback form is a good way to guide the process.

- Is the purpose and scope of the paper made clear?
- Are there errors of fact or interpretation?
- Is all of the discussion relevant?
- What should be expanded, condensed or omitted?
- Are all statements clear or ambiguous?
- What underlying assumptions does the author have?
- Has the author been objective?

Strengths

The peer review process is very good for identifying ways to improve a paper.

Peers, particularly those outside one's organization, may expose issues invisible to the author due to his/her inherent cognitive biases.

Weaknesses

It may be difficult to find peers. The topic may be highly specialized and the classification level may severely limit who can see the paper.

Potential peers may be too busy or act unprofessionally. Their comments may be superficial or incomplete. Their aim may be to embarrass the author or to protect their position by blocking publication and curtailing debate.

Only using friends and like-minded individuals as reviewers won't provide a full range of critical comment. This mutual backscratching merely reinforces existing views.

If the paper is urgent, peer review may take too long, especially if it is done sequentially.

Peer review deals poorly with innovative, ground-breaking work. Many important scientific papers were initially rejected by peer-reviewed journals.

PEER REVIEW FEEDBACK FORM

DOCUMENT			
Title	<div style="text-align: right;"><i>Publication Type</i></div> <input type="checkbox"/> Technical Report <input type="checkbox"/> Presentation <input type="checkbox"/> Technical Memorandum <input type="checkbox"/> Conference proceedings <input type="checkbox"/> External Client Report <input type="checkbox"/> Open / defence literature <input type="checkbox"/> Partner Document (Specify): _____ <input type="checkbox"/> OTHER (Specify): _____		
Authors(s)			
REVIEWER			
Reviewer's Name		Date Received	
Reviewer's Location		Time spent on review	[hours]
Anonymity Requested	<input type="checkbox"/> YES <input type="checkbox"/> NO	Is this a second review?	<input type="checkbox"/> YES <input type="checkbox"/> NO
SUMMARY EVALUATION			
<i>Evaluation (1 = unacceptable, 2 = marginal, 3 = acceptable, 4 = very good, 5 = excellent)</i>			
1 2 3 4 5	PRESENTATION	Is the report well-structured and organized (e.g. headings, tables, figures)?	
1 2 3 4 5	STYLE	Is the writing appropriate, clear and unambiguous?	
1 2 3 4 5	REFERENCES	Does the author mention and make use of necessary references?	
1 2 3 4 5	CONTEXT	Is the context and motivation for this work clear?	
1 2 3 4 5	THEORY	Is the study conceptually based and theoretically grounded?	
1 2 3 4 5	METHODS	Has the author used the proper methods, stating underlying assumptions?	
1 2 3 4 5	DISCUSSION	Does the evidence provided support the conclusions and analysis?	
1 2 3 4 5	RECOMMENDATIONS	Are there useful and appropriate recommendations to the partner?	
1 2 3 4 5	SIGNIFICANCE	Is the problem dealt with significant, and are the results useful?	
1 2 3 4 5	MERIT	Is this a substantial, original or innovative contribution?	
1 2 3 4 5	COMPLETENESS	Are the issues dealt with in a complete fashion?	
1 2 3 4 5	POLICY	Are policy issues and implications appropriately considered?	
<input type="checkbox"/> YES <input type="checkbox"/> NO	SECURITY	Are all security issues properly addressed?	
RECOMMENDATION			
5 = Accept publish in present form: 4 = Return for minor revisions: 3 = Return for major revisions –please return to reviewer for 2 nd evaluation after modification: 2 = Reject needs extensive revision but could be resubmitted: 1 = Reject fundamentally flawed			
1 2 3 4 5	Should this paper be accepted for publication?		
<input type="checkbox"/> YES <input type="checkbox"/> NO	Is a written response from the author(s) requested?		
Signature of Reviewer:		Date:	

ASSESSMENT OF REVIEW BY SECTION HEAD			
5 = Valuable, new insight, appropriately objective and detailed: 4 = Very useful review with some new insights: 3 = Brief but useful comments: 2 = Abbreviated or hypercritical comments of marginal use: 1 = Useless review, inappropriate remarks			
1 2 3 4 5	VALUE	Irrespective of the final recommendation of the review, how helpful or valuable were the comments in improving the report?	
Signature of Section Head:		Date:	

Presentation

- Does the paper tell a cohesive story?
- Is a tightly reasoned argument evident throughout the report? If not, where does the paper wander?
- Do the title, abstract, keywords, introduction and conclusions accurately reflect the major points in this report?
- Is the executive summary and abstract clear, concise and to the point?
- Is the overall length appropriate? What portions of the report should be expanded/condensed/combined/deleted?
- Has the author structured the document in an appropriate fashion (i.e. headings, annexes, etc.) with headings acting as a logical framework or road map supporting the "flow" of the document?
- Are graphs, figures, photos, tables etc. clear, appropriately formatted, and necessary to the argument or discussion?
- Do the legends for tables, figures and charts convey exactly what the reader should expect?

Style

- Is the writing concise, easy to follow and interesting?
- Is the writing style appropriate?

References

- Are all (and only) pertinent references cited correctly? If any are missing, please reference in the review.
- Are references provided for all assertions of fact not supported directly by data in this report or those not well known to potential readers?
- Is it clear how this work is related to work already accomplished and/or published?

Context

- Does the introduction clearly set the context (scientific, military, project, historic, intellectual, policy, etc) in which this work was undertaken?
- Does this work properly place itself in the context of previous work?
- If applicable, is it clear who requested the report, why, and how it will be used by them?
- Is the practical relevance of this work clearly articulated?

Theory

- If applicable, is the underlying theory/mathematics clear, accurate and appropriately developed and complete?
- Is other theoretical and methodological work properly referenced and built upon?

Methods

- Are the methods used appropriate? Current? Overly complex? Simplistic?
- Are the methods described clearly enough that the work could be repeated or extended by someone else?
- Are all underlying and necessary assumptions clearly stated, and the implications on the analysis clearly articulated?
- If software tools were used, is their role clearly understood? Have titles and version numbers been provided?
- Are there errors in inference, interpretation or mathematical analysis?

Discussion

- Are significant statements or deductions justified, and based on evidence contained within this report?
- Is it clear what is known (confirmed) and what is speculation, opinion, or conjecture?
- Does the discussion properly draw out and illuminate key results?
- Does the discussion have a logical flow and are the arguments cohesive, clear and concise?
- Are all key concepts understandable?
- Does the conclusion synthesize the main points of the report, leaving the reader with a deeper understanding?
- Can you easily verify results and conclusions by examining the associated tables and figures?

Recommendations

- Are any recommendations made? Should there be?
- Do the recommendations offered follow from the findings of the analysis?
- Is the strength/tone of the recommendations appropriate?
- Are the recommendations likely to be useful to the partner?
- Do they provide a good guidance for future research?

Significance

- In your expert opinion does this report make a significant or novel contribution?
- Does this report provide a strong foundation for follow on research?
- Are there errors in technique, fact, calculation or interpretation?
- Is this report scientifically or analytically rigorous, accurate, and correct?

Merit

- Is this report of a type appropriate for regular publication? If not suggest what forum might be more appropriate?
- Is the work novel and relevant?
- If this report were not published would it have any impact? If not then why should it be published?
- Is it clear why this work was done, who asked for it, and how it will be used?
- Does this report demonstrate thoughtful, scholarly formulation/implementation?

Completeness

- Is the report marked by a unity and continuity of parts, showing interdependence between these parts?
- Is the report self-contained?
- Is the overall balance correct for the report?

Policy

- Are the opinions expressed by the author scientific in nature and do not reflect policy judgements that are either inappropriate to the organization, or are inadequately supported by the data presented, or are not congruent with departmental policy?
- Are issues dealing with policy carefully and objectively considered?

Security

- Is the report properly classified?
- Are there "grey areas" within the document, with respect to security issues?
- Are distribution restrictions appropriate and consistent with policies and security guidance?

Written Comments

Reviewers are required to provide a one or two page summary identifying the problems found (or accomplishments observed) and suggesting how the report might be improved. These comments should expand upon the simple numeric grading used in the proforma.

- What are the questions being addressed by or major contributions of the report?
- What are the major weaknesses and strengths of this report?
- Is this paper scientifically and technically sound?
- Is the method or implementation novel and nontrivial?
- Are the conclusions supported by the data, theory or arguments presented?

Structured Analytic Technique



Pre-mortem Assessment

Purpose

To identify and examine the weaknesses in a judgment or assessment by *assuming* it was incorrect and asking "How did we go wrong?"

Description

The Pre-Mortem Assessment is "an audit before the fact." It asks analysts to imagine that time has shown that their judgement was dead wrong. The objective, now, is to figure out how it failed.

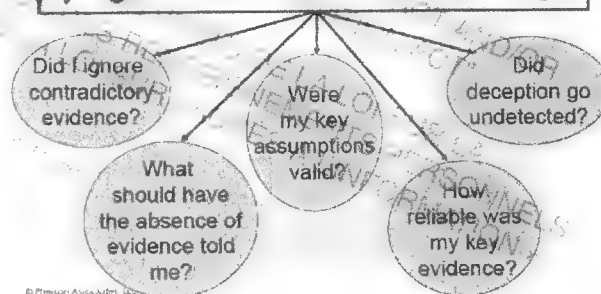
If done in a team, the process begins with structured brainstorming. "What led to this *unexpected* event? What were the signs it was going to happen?"

A comprehensive assessment of possible sources of analytic error should include:

- **Key Assumptions** – What assumptions were made? Were any weak or unsubstantiated? Should these have been highlighted? What was the impact of an invalid assumption?
- **Credibility of Critical Evidence** – What evidence or stream of reporting might have been false? What impact did this have?
- **Contradictory or Anomalous Evidence** – Was any data rejected or ignored? If so, did it suggest an alternative hypothesis?
- **Absence of Information** – Were there major information gaps?
- **Deception** – Did anyone have motive, opportunity or means to deceive you?

Common Analytic Pitfalls – Were alternative hypotheses considered? Would a change in the broad environment (technological change, globalisation, environmental change, etc.) have had an impact on the analysis?

What if my main conclusion or key judgment turns out to be flat wrong?



Usage

Analysts should use the Pre-Mortem Assessment just before finalising key analytic judgments. Teams should use it as soon as the group starts to coalesce on a consensus position.

Requirements

This technique requires a dispassionate and detached attitude. There can't be any vested interests or "sacred cows".

Strengths

The primary goal of the Pre-Mortem Assessment is to reduce the risk of surprise and the subsequent need for a post-mortem investigation by providing a totally unbounded yet highly structured mechanism to explore all the ways an analysis could turn out to be wrong.

Many members of small groups suppress their dissenting opinions. The technique gives team members that have unspoken reservations a license to speak out against the group consensus. Because identifying *weaknesses* in the previous analysis is encouraged, the group views the raising of issues as a positive contribution to improving the analysis.

Weaknesses

Egos and lack of imagination may interfere.

Source: *Handbook of Analytic Tools & Techniques*, Pherson, 2008.

Structured Analytic Technique

Quality of Information Check

Purpose

To provide a firm foundation for analysis.

Description

Information is the raw material of analysis. Data, facts, opinions, evidence, and proof are all types of information.

Analysts use information from a variety of sources. Each source has its pros and cons (see INT Comparison Chart).

By processing information, analysts transform it into one of four basic types of intelligence: Basic, Current, Estimative, or Warning. The first step in this transformation is usually coalition, organizing raw information. The second is evaluation.

Usage

Evaluating the quality of information is crucial to estimating probability and expressing a level of confidence concerning a judgement.

A quality of information check may uncover enemy attempts at denial and deception (D&D).

Analysts should periodically reconfirm the information on which their analytic judgments are based.

Requirements

To evaluate quality, analysts need to know:

- Who or what provided the information?
- Why? What was the motive?
- What was the basis of their knowledge?
- How was the information collected? Under what circumstances?
- How was it reported?

The basic process has seven steps.

- How old is it? When was the information obtained? When was it reported? Is the lag a problem?
- Where did it come from? Which agency or organization? What is their reputation?
- Where did they get it? What was the origin? How many links were in the "chain of acquisition"?
- If HUMINT, how are sources described and rated? Read the source context statement.
 - How did this **source** come to know this information? Is this plausible?
 - Does the **source** have the requisite background or access to report reliability on this issue?
 - Is the **source** biased?
- Is the information consistent with previous information?
- Does the information make sense? Is it plausible? Are there any errors of fact?
- Could this be a deception? Is the information too good or too specific?

Strengths

Having multiple sources on an issue is not a substitute for having good information that has been thoroughly examined.

Weaknesses

If no objective criteria or basis of comparison exists, it is difficult to say that one thing is better than another.

For reasons of security, it is often difficult to know the full context and conditions under which critical information has been collected.

Errors in processing, translation, or interpretation may garble the message.

Quality of Information: INT Comparison Chart

OSINT	HUMINT	SIGINT	IMINT
Collection risk: low Cost: low	Collection risk: high Cost: medium	Collection risk: low* Cost: high	Collection risk: low Cost: high
Pro <ul style="list-style-type: none"> • broadest coverage • good for identifying emerging issues (can be very up-to-date) • easy to access • generally, minimal risks in collection • cheap • no restrictions on use (easy to share) • quality varies, but good for a "first pass" Con <ul style="list-style-type: none"> • high volume • unstructured • may contain diatribes, polemics, hyperbole, propaganda, and some nuts! • difficult to assess quality (scholarly journals to personal blogs) • language issues • may alert a sophisticated target 	Pro <ul style="list-style-type: none"> • first-hand information • richest and most detailed information • goes to motives and intent • target will not usually know information reported • flexible - can cover anything (in theory) • only possible source for some hard targets • relatively inexpensive Con <ul style="list-style-type: none"> • difficult to recruit good sources on hard targets, • may take a long time to set-up a source, • policy may limit who can be recruited, • sources have biases and personal agendas; • they make mistakes, exaggerate their role or access and they embellish information, • money does not guarantee loyalty, • a source may be a fabricator, double agent, or dupe, • source information is hard to verify (i.e. "single and sensitive source") • good tradecraft is necessary to cope with these problems, • large administrative burden (for organization and handler), • medium to high personal risk 	Pro <ul style="list-style-type: none"> • large volume of high quality information • remote access and usually not dangerous to collect • broad coverage of potential targets • potential to provide insight into plans and intentions Con <ul style="list-style-type: none"> • hard to use or share due to high classification • passive (even random) • high volumes of low yield intelligence makes gold hard to find • costly - requires intensive resources equipment, code-breaking, decoding, translating and disseminating • many insignificant and significant actors who are poorly informed • many key targets know how to avoid detection • deception easy for knowledgeable targets • low tech targets with no SIGINT profile may be most important • challenge to store and retrieve <p><i>*Note: While the personal risk is low, SIGINT collection is politically sensitive and therefore a high risk for governments.</i></p>	Pro <ul style="list-style-type: none"> • persuasive • very broad coverage • provides essential information on physical items • intensive magnification from satellites provides very specific information, especially on military assets, infrastructure, damage assessment, activities which leave marks • good for change detection • photo interpretation is a well-developed art • adversary probably underestimates our capability Con <ul style="list-style-type: none"> • not always available • more useful for capability than for intent • more useful for tactical/military than strategic/civilian • material can be misinterpreted • many targets can disguise or hide assets

Structured Analytic Technique



Red Cell

Purpose

A Red Cell is an internal think tank created to help an organization develop broader peripheral vision and avoid surprise.

Description

In response to 911, the CIA created a Red Cell that would think unconventionally about the full range of relevant analytic issues. Their short "think pieces" about plausible events for which there was currently little or no evidence were intended to provoke thought rather than to provide authoritative assessment. The DHS set up a similar program in 2004.

A Red Cell does not automatically take the opposite or contrarian view – it is not a challenge technique. It merely tries to raise awareness. The process starts with a question such as: *"Could the UN in New York be attacked using explosive laden garbage barges?"*

Any feasible question is OK – although, ideally it should be one that no one else has asked. The next step is generating a series of events or scenario that would lead to the event occurring, i.e. "What if?" analysis. Finally, a short but (hopefully) convincing argument is presented that summarizes the evidence and reasoning.

Usage

A Red Cell can be permanent or ad hoc to deal with specific issues (in which case it might be referred to as a "Team A / Team B" exercise or a "Red Team" if it simulates the actions or decision-making process of an adversary).

The goal of a Red Cell report is to persuade experts, analysts, and decision makers to re-examine their views and temporarily re-task resources to prove or disprove the theory suggested by the Red Cell.

Requirements

A Red Cell needs a diverse group of people who are "out of the box" thinkers. Not afraid to speak out or appear the fool, they should be ingenious and resourceful.

Members could include psychologists, philosophers, professors, and analysts from various units and agencies who think differently from the ones who typically work on the account (i.e. file / issue / problem).

Outside technical experts may be included or consulted (depending on the problem).

To ensure a continual flow of fresh insights, new members can be rotated in every three months.

Management should give permanent Red Cell units lots of latitude (two thirds of CIA Red Cell reports are self-initiated).

Strengths

This imaginative technique helps to combat assumptions, mindsets, and biases.

Weaknesses

A Red Cell that constantly critiques or "shows-up" the analysis of others can create internal tensions. Reports may provoke hostility from overtaxed workers. "As if we didn't have enough problems already!"

A Red Cell that "colours too far outside the lines" risks being ignored or mocked.

If Red Cell reports undermining mainstream analysis are distributed externally, the agency could appear indecisive.

Small organizations may not be able to afford removing staff from their regular duties to work in a Red Cell.

Some argue creativity cannot be forced.

Structured Analytic Technique



Red Hat (Anthropology)

Checklist for Understanding Groups

Purpose

To obtain a deeper and better understanding of a group, tribe, or organization.

Description

Initially, it may seem that a group is homogenous. Rarely is this the case.

Depending on the complexity of the group in question, it may take several months or years to fully understand its dynamics.

The *Checklist for Understanding Groups* is a series of questions to provoke and guide efforts to "fill in the holes" more rapidly and more thoroughly than would be the case with a less structured approach.

Usage

Analysts begin by asking the following questions:

1. What defines this group (geography, history, purpose, etc)?
2. Is it homogenous or are there internal factions (religious, ethnic, linguistic, generational)?
3. How is power distributed? Is it matriarchal or patriarchal? Is it based on wealth, fear or moral authority? Are positions earned or inherited?
4. What motivates and inhibits individual conduct, e.g., shame or face (prestige, honor/reputation)?
5. What pressures and stresses (internal and external) are present on the group? E.G. Are they running out of money and food? Is another gang trying to take over their territory?

6. How is the culture changing? What are some signs of vibrancy or decay, e.g., increasing membership or disillusionment?

7. What unusual values, attitudes or beliefs are present? What are the taboos?

8. How are outsiders viewed? Is this group xenophobic, security conscious, etc?

9. What are the capabilities and intentions of this group?

10. Do members of this group think as you do?

In each case, analysts should be resourceful in looking for indicators (of fractionalization, power, etc.).

Requirements

A degree in anthropology or sociology is useful.

Strengths

With deeper understanding of a group, it becomes easier to penetrate, investigate, disrupt or prosecute; tactics can be developed for engagement and manipulation; and potential problem areas for misunderstanding or misinterpretation can be identified.

Weaknesses

Understanding another culture (or sub-culture) is difficult. Often, it is only possible to observe.

This *etic* (outsider) perspective is fraught with risk. Whatever the observer is allowed to see may be orchestrated to mislead.

It is preferable to understand behaviour from the insider's perspective. However, this *emic* (insider) understanding is much harder to get.

Cultural Intelligence in Iraq

Human Terrain Teams (HTT) composed of cultural experts have been deployed by the US Army in Iraq. Their mission is to diagram Iraq's cultural landscape – its "human terrain" – in the same way intelligence analysts map out its cities, roads, and rivers.

David Matsuda, a cultural anthropologist from California State University, is attached to the HTT for the 82nd Airborne Division's 2nd Brigade Combat Team which operates in Northeast Baghdad and Sadr City. When US soldiers were doubtful that a food distribution depot could be kept secure, Matsuda explained how the tribal relationships of the depot's Chief of Security protected it.

Matsuda is the social scientist on a team that also includes a chief, an area specialist, and a research manager. Matsuda is a civilian while the other members are active duty army.

To accomplish its mission, the team uses information that has already been collected and information that the team members collect themselves. They then analyze the information and present their conclusions and advice to the brigade commander.

Outside the military, however, the teams have sparked some controversy. Much of the opposition has come from people in the academic world, who, according to Matsuda, fear that the army will misuse the knowledge offered by social scientists.

"(Some are) saying anthropology can't be part of the Army without being corrupted," he said. Matsuda said some of the concerns are valid, and some are motivated by knee-jerk anti-militarism. Regardless, he said, the stakes are too high in Iraq right now to sit on the sidelines.

Anthropologists believe that all societies operate according to a certain "script," Matsuda said. Iraqis have one script, Americans have another.

The HTT's mission is to provide an interpretation of the Iraqi cultural script that will help soldiers make the right decisions.

The team has carried out that task in ways both small and large. When the brigade was about to put out a wanted poster featuring an image of the scales of justice Matsuda pointed out that the idea of the scales of justice was a Greek-derived, Western concept that meant nothing to Iraqis. Instead he proposed changing the poster to show two open hands – an image drawn from ideas in the Quran – in order to make it more resonant with Iraqis.

"We try to find the assumptions and motivations behind what people do," Matsuda said.



Source: Culture Experts: Human Terrain Team helps Soldiers in Iraq understand the cultural landscape by Sgt. Mike Pryor, 2nd BCT, 82nd Airborne Division, Public Affairs.

Further Reading:

- Army Enlists Anthropology In War Zones, *New York Times*, Oct 5, 2007. Combat operations reduced by 60 percent after scientists arrive.
- The Human Terrain Mapping: A CORDS for the 21st Century, (pdf), *Military Review*, Sept-Oct 2006.
- Human Terrain System. Bridging the Gap: Making Social Science Operationally Relevant, (ppt), Lt. Col. Edward Villacres, Team Leader, HTT, 82nd Airborne Division's 2nd Brigade Combat Team, (2007).
- The Laboratory for Human Terrain, Dartmouth University.

Structured Analytic Techniques



Red October

Purpose

To understand what an adversary is planning, assess the feasibility of their plans, and the impact of their actions.

Description

Red October (RO) combines Red Teaming with feasibility analysis. It can reveal when a terrorist group's ambitions exceed its capabilities or when an attack scenario is unworkable.

In Phase One, the facilitator tells participants that they will take on the role of an adversary who is planning an attack. Their job is to identify the adversary's most likely targets and their tactics, techniques, and procedures (TTPs).

The facilitator begins by defining the question, E.G. "What kind of successful attack can al-Qa'ida in the Arabian Peninsula (AQAP) conduct against critical infrastructure in Yemen?"

He then asks the group to describe what they (as the adversary) would consider "success". How do they see their capabilities?

The facilitator may guide participants through an group discussion (who, what, where, why, when and how) using Structured Brainstorming.

The facilitator captures ideas raised during the discussion then, following the session, summarizes everything into an "attack plan".

In Phase Two, a separate group of technical experts determine the feasibility of the attack plan, damage it would cause, and the regional and global effects. They discuss the viability of the plan and the impact of a successful attack.

In Phase Three (optional), everyone comes together. The participants get feedback from the experts. Everyone discusses the effects of biases, expectations, assumptions, and mirror imaging.

Usage

Analysts have used the RO methodology to determine how a terrorist group would attack a known infrastructure target.

Requirements

Choosing the right group of participants and technical experts is critical. Participants are typically regional subject matter experts who can address the intent and capability of the adversary. Technical experts come from the military and emergency management. They could include doctors, economists, and engineers.

In advance of Phase One, participants should be provided with a briefing package. It should describe the adversary (goals, history, strengths, and weaknesses) and provide information on potential targets of an attack.

Strengths

Red Teaming does not address the impact and consequences of an attack. RO does.

The RO methodology gives analysts insight into actors' thinking about the planning, execution, impact, and success of a plan or mission.

The methodology develops specific signposts and indicators to drive collection, a deeper understanding of the technical aspects of attacking the target, and bounds the implications of a targeted attack in more realistic parameters for policymakers.

RO mitigates potential mindsets, anchoring, and expertise biases that could narrow or overstate their perspective of the threat that terrorist groups pose to known targets.

Weaknesses

Mirror imaging is difficult to overcome.

Source: US National Counterterrorism Center, 2014

Structured Analytic Techniques



Red Team

Purpose

To simulate the thoughts and actions of an adversary.

Description

In military exercises, the Red Team represents the adversary, the Blue Team our own forces.



The Red Team follows the techniques, tactics, and procedures (TTPs) and uses the same equipment as the adversary. It tries to emulate all their capabilities and weaknesses.

The idea is to test Red against Blue, exposing vulnerabilities and weaknesses. This role-playing conflict can be real, simulated, or imagined.

The approach can be extended to any scenario involving an adversary. For example, to test its computer security, an organization could ask its own IT department to form a "Tiger Team" which would then try to hack into its systems.

The process often starts with a simple question, E.G. "If I were a money launderer, how would I try to get around the rules and regulations?"

The analyst then transforms into an "actor" operating within the adversary's culture and political milieu.

Usage

An analytic Red Team exercise can help predict the actions and reactions of an adversary, both at the tactical and strategic levels.

Requirements

Members of a Red Team need to have a deep understanding of the adversary. This includes

- cultural norms, values, and motives,
- operating doctrine and environment,
- sensitivity to risk, and
- their subjective understanding of our intentions and capabilities.

An effective Red Team immerses itself in the circumstances of the adversary and reacts to stimuli as they would.

The team asks "first-person" questions like:

- What guides my actions? Am I a risk-taker?
- What would my peers, family, or tribe expect me to do in the face of ...?
- How do I perceive and react to external threats and opportunities?
- What personal factors influence my decision making? Age? Religion? Parenthood?

The team takes full advantage of the "native" knowledge of its members, irrespective of rank.

Strengths

A Red Team frees itself of the mind-set of the Blue Team. This simple shift in perspective may lead to new insights into the courses of action available and acceptable to an adversary.

A Red Team can overcome the tendency to assume others think and perceive the world as we do (mirror imaging). It may explain the seemingly irrational acts of a foreign leader.

Weaknesses

An adversary without doctrine is difficult to imitate.

Testing oneself against a Red Team that is artificially constrained, is not a real test.

This technique requires a lot of time.

How to write a "Red Team" Paper

There are three approaches to writing "Red Team" papers.

- Standard
- Native Guide
- Fellow Traveler

All three approaches begin by examining the adversary's values, options, and constraints to develop a theoretical model of their thoughts and potential actions.

This is called "Deductive Red Teaming." The goal is to predict how the adversary would respond to a particular stimulus.

Standard Red Team Paper

A "Standard" red team paper has a detached, 3rd party narrative. E.G. "If the United States were to do X, given past behaviour and current constraints, Russia could do Y."

This can be given more impact by including actual quotes. E.G. On April 27th, in a speech to Russian businessmen, Putin assured them that the government will do *"whatever is necessary"* to protect business interests abroad.

Native Guide Red Team Paper

A "Native Guide" paper presents the issue from the perspective of someone "on the ground", i.e. someone directly affected by circumstances. It could be the view of a crisis through the eyes of a foreign leader. This helps the reader appreciate their world view (and their depth of hatred or desperation).

The technique was used in 1939 by R.V. Jones who was having trouble convincing his superiors about German technical advancements. In two of his reports to the British Air Ministry he included imaginary conversations between German officers in his reports to make his reports more convincing.¹

Writing on the state of the Afghan army and worried that your paper could end up being rather dry and boring with lots of statistics? Try the Native Guide approach!

How? What about a paper written from the perspective of a "Day in the Life" of an Afghan army private? It could cover all the same issues as a regular paper (morale, training, equipment, etc.), but from the point of view of a soldier.

Paint a vivid enough picture and readers cannot help but imagine themselves in the circumstances of the protagonist.

The Native Guide approach is used all the time by journalists. Reporting on a famine or flood, they'll personalize the story by talking to a victim or an aid worker. This makes it easier for readers to relate to the story. It also makes the story more visceral and more memorable.

The Native Guide approach works best with readers who like scenarios. However, it does not work well with all readers (some see it as going "over the top") and it can be over-used.

Fellow Traveler Red Team Paper

The last approach for a Red Team paper is "Fellow Traveler". It is recommended for situations where you have no information on the adversary but are still required to write a paper.

The best you can do in such circumstances, is reasoning by way of historical analogy.

Don't know anything about insurgents in Afghanistan? Write about insurgencies (in general) drawing on the Basques, Chechnyans and Tuaregs. Reach into history if need be.

While a "Fellow Traveler" paper is highly theoretical, it still provides a basis for discussion.

Footnotes:

1. Jones, R.V. Most Secret War: British Scientific Intelligence 1939-1945. Penguin Press, 1978, 2009.

Structured Analytic Techniques



Rumsfeld Square

Purpose

To force a more comprehensive consideration of a problem and identify areas of risk.

Description

On Feb. 12, 2002 US Secretary of Defense Donald Rumsfeld explained to the press that:

There are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns – there are things we do not know we don't know.

While "known unknowns" are identified intelligence gaps, Rumsfeld's concern was being surprised by an unsuspected problem or issue, an "unknown unknown," things that a commander doesn't even know he doesn't know.

Rumsfeld didn't mention the "unknown knowns," that is, the things we don't realize we know. The complete set can be captured in a "Rumsfeld Square".

"Known Knowns"	"Known Unknowns"
"Unknown Knowns"	"Unknown Unknowns"

Usage

The Rumsfeld Square can be very helpful for planning a research project or improving a collection plan.

Requirements

Ideally, a team is assembled to consider the problem or task at hand. Systematically, they work their way through each quadrant of the Rumsfeld Square, listing items as they go.

The following order is recommended.

- *Known knowns*: What do we already know?
- *Known unknowns*: What do we need to find out?
- *Unknown unknowns*: Are there issues/aspects that we are not considering?
- *Unknown knowns*: Could the answers already be somewhere in our databases?

By the end, each square should be filled with a set of facts, questions, and suggestions for follow-up.

Strengths

The Rumsfeld Square is a meta-planning tool that encompasses several approaches and uses multiple structured analytical techniques (SATs).

Known knowns

- Mind map / Concept map
- Quality of information check
- Data visualization (charts, timelines, etc.)

Known unknowns

- Intelligence Collection Plan
- Collaboration/Outreach

Unknown unknowns

- Alternative Futures
- Cone of Plausibility
- Red Cell
- Collaboration/Outreach

Unknown knowns

- Data mining
- Knowledge management

It is common to focus only on finding answers to the "known unknowns". Using the Rumsfeld Square, analysts may find reliability issues with their "known knowns", they may re-interpret the problem after discovering an "unknown unknown" or they may save time and money by uncovering and exploiting an "unknown known".

Weaknesses

This technique works best as a group exercise facilitated by an analytic methodologist.

Structured Analytic Techniques



Social Network Analysis

Purpose

To reveal patterns of interaction and the allocation of social and personal capital within a group of people.

Description

Social Network Analysis (SNA) uses sociograms and mathematical computations to reveal significant aspects of behaviour in groups. The sociograms (network analysis charts) can show the relative importance of individuals in a network, and the nature and relative strengths of the links between individuals.

Concepts used in SNA include:

- **Centrality** - the relative position of an individual within a network. Centrality reveals influence and control over communications and other exchanges.
- **Density** - the number of links in a network as a percentage of the number of possible links. In general, high density groups adapt more easily to the loss of an individual, while low density groups are harmed less by an informant in their midst.
- **Redundancy** - the extent to which two or more individuals are equivalent to each other. The equivalence may be in terms of their network role, or their functional capabilities.
- **Cutpoints** - individuals who are the sole connections between network components.

Usage

SNA is emerging as a useful technique in targeting intelligence. It can break groups into smaller, separate entities, and can identify individuals whose removal would cause the greatest disruption in the group's functioning.

SNA is an evolving interdisciplinary technique with diverse approaches from Anthropology, Mathematics, Psychology, and Sociology.

Requirements

Detailed information about the connections between individuals in the group under study, including the nature and content of those connections.

Strengths

Identifies the structural strengths and vulnerabilities of a group. In groups with a hierarchical structure, SNA reveals patterns of communication, exchange and influence. In groups without formal hierarchy or structure, the social network is the primary organizing principal.

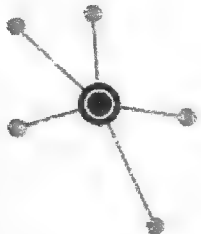
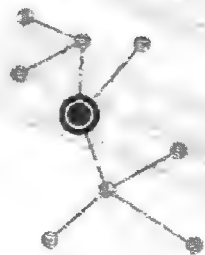
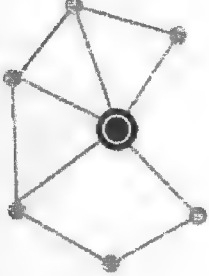

Weaknesses

Requires rich data about the content of links between individuals, which can be difficult to acquire when studying covert groups.

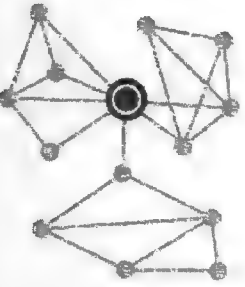
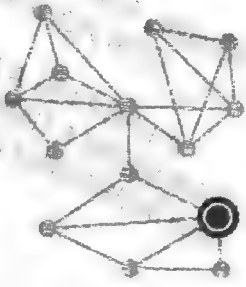

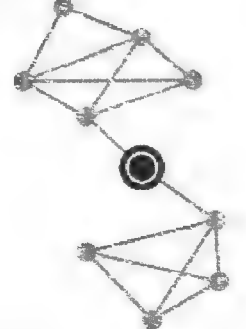
References

- Social Network Analysis as an Approach to Combat Terrorism: Past, Present, and Future Research Steve Ressler, Homeland Security Affairs, Vol. II, No. 2 (July 2006).
- A Social Network Analysis of Aum Shinrikyo: Understanding Terrorism in Australia – Stuart Koschade, Ph.D. Candidate Centre for Social Change Research Queensland University of Technology, October 28, 2005.
- Understanding Jihadi Networks, Strategic Insights, Volume IV, Issue 4 (April 2005) by Marc Sageman, M.D., Ph.D.
- Complex Social and Value Networks: The Jihadi Case (Global Network Terrorism) (ppt) – A database of over 500 Southeast Asian Jihadis.
- "Notions of Position in Social Network Analysis" pp 1-35 in Sociological Methodology, Vol 22. Stephen P. Borgatti and Martin G. Everett, 1992.
- "Destabilizing Networks" pp 79-92 in Connections 24(3). Kathleen M. Carley, Ju-Sung Lee, and David Krackhardt, 2002.
- "The Network Paradigm Applied to Criminal Organizations", Peter Klerks, 2001.

SNA Measures of Centrality

 <p>Degree Centrality Degree = 5</p> <p>Definition Node with the most connections</p> <p>Interpretation "Knows a lot" or "Well known"</p>	 <p>Betweenness Centrality</p> <p>Definition Node in the best path to get to everyone else</p> <p>Interpretation "Collaborator" or "Group Connector"</p>
 <p>Closeness Centrality</p> <p>Definition Node closest to all other nodes</p> <p>Interpretation Fast access to information</p>	 <p>Eigenvector Centrality</p> <p>Definition Node most connected to other most connected nodes</p> <p>Interpretation "Snobbishness" or "Strong Social Capital"</p>

SNA Key Roles

 <p>High Level Leaders</p> <p>Definition High betweenness, high eigenvector</p> <p>Interpretation Executive Officer of a company, Military Commander</p>	 <p>Emerging Leaders</p> <p>Definition High total degree, low eigenvector</p> <p>Interpretation Mid-level executive in a company, cell-leader in a terrorist organization</p>
 <p>Gatekeepers</p> <p>Definition Low total degree, high eigenvector</p> <p>Interpretation Executive assistant, courier</p>	 <p>Boundary Spanners (potential)</p> <p>Definition Low total degree, high betweenness</p> <p>Interpretation Facilitators, go-betweens, financiers</p>

- In 2008, a graduate student from Mercyhurst College used SNA to better understand terrorist enlistment. Her report (<http://terrorismna.blogspot.com>) does a good job of laying out the strengths and weaknesses of SNA in attribute analysis.
- **A Social Network Analysis of Jemaah Islamiyah: The Applications to Counterterrorism and Intelligence** Stuart Koschade, School of Humanities & Human Services, Queensland University of Technology, Carseldine, Australia Studies in Conflict and Terrorism, Volume 29, Number 6 / September 2006, Pages: 559 – 575. This article describes a social network analysis of the Jemaah Islamiyah cell that was responsible for the Bali bombings in 2002.

Structured Analytic Technique



Structured Comparison / Multiple Attribute Analysis

Purpose

To rank-order priorities for complex issues with large sets of options.

Description

This technique uses a set of defined criteria to allow a formal comparison of entities or phenomena.

The set of attributes (criteria, qualities) and their values used will be specific to each problem.

The set of attributes establishes a common ground for comparison among the range of options.

Usage

Multiple Attribute Analysis / Multiple Criteria Analysis are approaches to decision making used in the private sector, military and government.

In the context of intelligence analysis, structured comparison tools have to be specific to the decision-making problem. For example, an analytic tool designed to rank-order organized crime groups in terms of their strengths and weaknesses will not be valid for terrorist groups.

Requirements

The attribute set must be developed by the appropriate range of subject matter experts in order to ensure relevance to the problem.

The criteria must have clear working definitions to calibrate the technique, and so ensure the reliability of the results.

Analysts will need to have a good understanding of the criteria as defined in the technique in order to apply it.

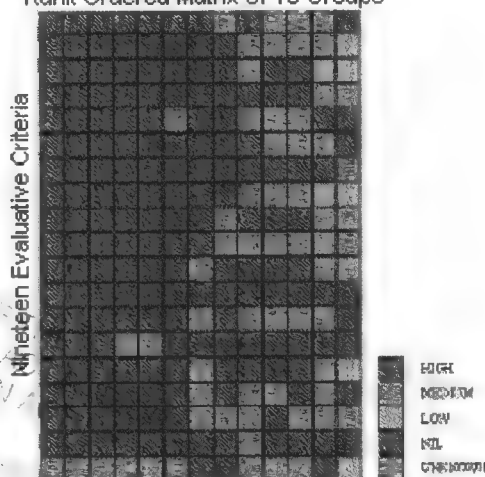
Strengths

More objective, comprehensive, and reliable than unstructured comparison exercises.

Can be repeated over time, and can be applied by multiple groups of analysts.

Increases credibility of rank ordering, and permits auditing of the process.

Organized Crime in Canada
Rank Ordered Matrix of 13 Groups



Weaknesses

Time and resources are needed to create specific attribute sets.

If the process and results are not reviewed, there is the potential for respondents to slant their input, consciously or unconsciously, in an attempt to promote their preferred results.

Recommended Readings

Multiple attribute analysis is taught in business management, so there is detailed information available on the Internet.

- Project Sleipnir – An Analytical Technique for Operational Priority Setting, a paper presented by Steven J. Strang, RCMP, at the 2005 International Conference on Intelligence Analysis, McLean, VA, May 2 to 4, 2005.

Structured Analytic Technique



Team A / Team B

Purpose

To provide a self-check that confirms, refutes, or offers an alternative (competing) assessment.

Description

Team A / Team B is a competition, akin to a debate. However, unlike Devil's Advocacy, which simply tries to refute an argument, it permits the expression of different views.

Separate teams are given the same problem. They may be told to take opposite sides or left to arrive at their own independent conclusions.

Usage

When debate is polarized between two views, the Team A / Team B approach helps clarify the differences between the two viewpoints.

When analysts have developed an inflexible mindset, it can force a re-evaluation.

Requirements

In the Analysis Phase:

- Begin by identifying the two (or more) competing hypotheses or points of view.
- Form teams (or designate individuals) to develop the best case that can be made for each hypothesis.

In the Debate Phase:

Both teams present their arguments before an independent jury.

- The teams critique each other's assessments then respond to criticisms.

The jury listens, questions, and decides which team has the stronger case. It may also recommend actions to be taken, e.g. further research.

Strengths

Assigning analysts to the team that fits their existing view expedites the process and makes for strong arguments. The reverse takes more time, but forcing analysts to argue "the other side" can often make them more aware of their own assumptions, mindsets and biases.

The process can help opposing experts see the merit in each other's arguments. It also allows those with opposing views the opportunity to express their views and feel that they have been heard.

For the decision-maker, this technique exposes and explains important analytic differences within the expert community. Senior officials often learn more by weighing well-argued conflicting views than from reading an assessment that masks substantive differences or drives analysts to the lowest common denominator.

Weaknesses

The process requires time and resources. A small organization covering a large area may not be able to afford temporarily reallocating several analysts to work on the same problem.

Competition may lead to workplace acrimony.

Results may be skewed if one team has a political agenda (E.G. CIA Team B experiment).

Further Reading

- [SourceWatch](#) and [Wikipedia](#) (user-contributed articles).
- [Team B Intelligence Coups](#) (pdf) by Gordon R. Mitchell, Quarterly Journal of Speech, Vol. 92, No. 2, May 2006, pp. 144-173.
- [It's Time to Bench "Team B"](#) by L. Korb, Aug 2004.
- [Team B: The Reality Behind the Myth](#), Richard Pipes, Commentary Magazine, Oct 1986. Subscribers only.
- "Re-examining the Team A-Team B Exercise" by Robert C. Reich, International Journal of Intelligence and CounterIntelligence, Volume 3, Issue 3 1989, pp. 387-403.
- [Team B: The Trillion Dollar Experiment](#), Anne Hessing Cohn, Bulletin of the Atomic Scientists, April 1993.

Structured Analytic Technique

Venn Analysis

Purpose

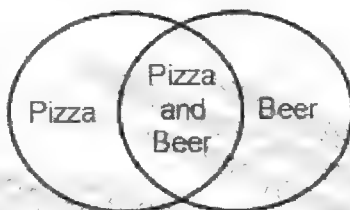
To graphically explore the logic of arguments.

Description

Venn diagrams which are commonly used to teach set theory in mathematics can also be used to illustrate simple set relationships in analytic arguments.

A simple Venn diagram typically shows the overlap between two sets.

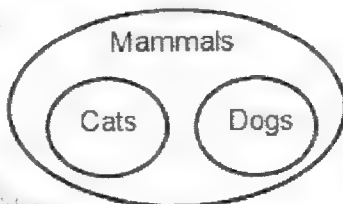
In one set, for example, are people who like pizza. In the other set are people who like beer. In the middle are people who like pizza and beer.



Circles might also be "nested" within one another, showing that one thing is a subset of another in a hierarchy or taxonomy such as kingdom, phylum, class, order, family, genus, and species.

Applied to an argument, Venn diagrams can reveal invalid reasoning such as:

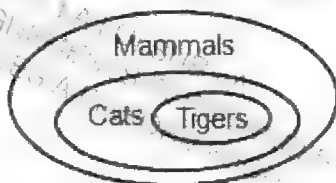
- Cats are mammals.
- Dogs are mammals.
- Therefore, dogs are cats.



As the diagram shows, dogs are not a subset of cats nor are there any dogs which are also cats.

Consider a different argument:

- Cats are mammals.
- Tigers are cats.
- Therefore, tigers are mammals.



The Venn diagram shows the argument is true.

Usage

This approach can be used anytime an argument involves a portion of something, e.g. the portion of total foreign investment in Canada from "Freedonia". It is also useful when the subject at hand needs to meet a narrow set of conditions, e.g. the "window of opportunity" for a space launch.

Requirements

Venn analysis can be done individually, but works very well when done in groups. Here are the steps:

- Represent the elements of a statement or argument as circles. Use large circles for large concepts or quantities.
- Examine the boundaries of these circles. Are they well defined or "fuzzy"? How are these things determined, measured, or counted?
- Consider the impact of time. Are the circles growing or shrinking? This is especially important when looking at trends.
- Check the relative size and relationships between the circles. Is it accurate? Are any assumptions being made?
- Zoom-in / Zoom-out. Are there elements within circles? Can larger circles be added?
- Examine and compare overlapping areas. What is found in each one? What is significant about their relative sizes? What is changing over time?

Strengths

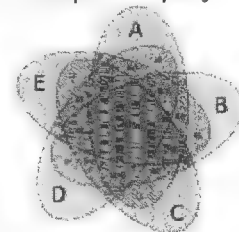
Visualizing logical relationships often reveals flaws in reasoning and prompts deeper inquiry.

Weaknesses

Diagrams can become complicated

Further Reading

- [Symbolic Logic](#), Peter Suber, Earlham College
- [Symbolic Logic](#), Lee Archie, Lander University.



Venn Analysis – An Example

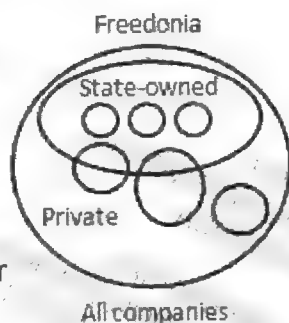
Consider the following statement:

"The recent investments of state-owned Freedomian businesses in Canada's strategic sectors are a risk to national security."

The flow of funds is: Freedomia ⇨ Canada

On the Freedomian side, reference is made to "state-owned" businesses.

A circle could be drawn with several smaller circles within it representing the state-owned businesses. If we "zoom-out", a larger circle, encapsulating the first, could show "All Companies".



This allows us to add circles for companies that are in the private sector as well as some that are partially state-owned.

This simple diagram raises questions such as:

- What percentage constitutes "state-owned"?
- What constitutes "controlling interest"?
- In a totalitarian state (like the mythical Freedomia), is this distinction even meaningful?

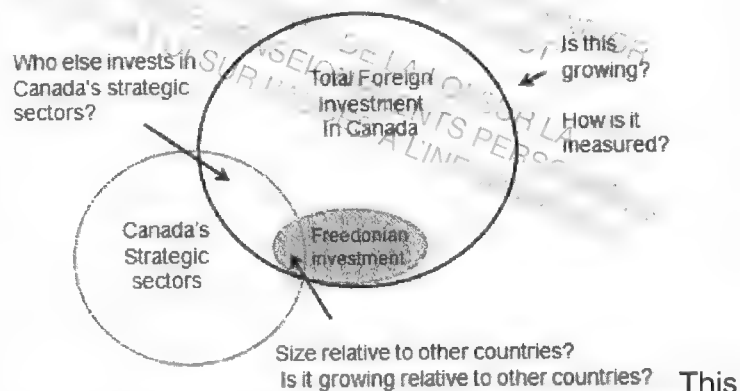
It also highlights an assumption:

State-owned = State-controlled

Other assumptions, implicit in the statement are:

**State-owned = Hostile
Private Sector = OK**

The statement also mentions "Canada's strategic sectors". If this is represented by a circle, an overlapping circle could show that some investment in these sectors comes from foreign sources, including Freedomia.



Venn diagram reveals additional matters that need to be addressed.

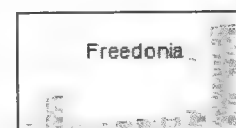
First, consider the boundaries of the circles. Do we know the amount of foreign investment in Canada with precision? What is a "strategic" sector? Does it include bio-tech? What about nano-tech?

Second, are these circles growing or shrinking? Is a 10% increase in Freedomian investment suspicious if total foreign investment grew by 10%?

Third, examine the relative size and relationships between the circles. Is the representation accurate? Can we assume that Canadian companies are the biggest investors in strategic sectors? What constitutes a Canadian company?

Fourth, "zoom-in" to examine overlapping areas. Who else invests in Canada's strategic sectors? Does Freedomia invest the most? How are its investments different from other countries?

Many analytic arguments highlight differences and trends. But before arguing something is significant, it needs to be put in context.



Foreign investment in Canada by other countries

Examining the relationships between the overlapping areas of a Venn diagram helps puts things in perspective.

Structured Analytic Technique

What if? Analysis

Purpose

To challenge existing views.

Description

Analysts assume that an event has already occurred then explain how it came about.

Usage

"What If?" analysis is a contrarian technique. It is used to challenge an existing judgement or strong mind-set.

Use this technique when a judgement rests on limited information or unproven assumptions.

The technique focuses attention on the mechanics of how something could happen, but could also be used to explore consequences (another good technique in this respect is *High-Impact/Low-Probability* analysis).

A "What If?" analysis could be presented as a sidebar to conventional wisdom.

Requirements

Begin by assuming an event has occurred.

Express this as a statement.

Identify key drivers which would shape or affect the event, e.g. the death of a nation's leader.

Ask how this driver would have to change in order to lead to the event/situation in question.

Ask what indicators exist that might signal a change in this driver.

Ask why or how this change might take place? What could trigger it?

Strengths

By shifting the focus from whether an event could occur to how it may happen, analysts allow themselves to suspend judgement about the likelihood of the event and focus more on what developments—even unlikely ones—might enable such an outcome.

The technique leads to developing indicators or signposts for the occurrence of the event.

Identifying the factors that could cause—or alter—an event provides decision makers with opportunities to shape the future.

Weaknesses

It may be difficult to conceive an alternative interpretation or reality. Structured brainstorming (divergent/convergent) thinking may help.

The full process is lengthy. The short form is to simply select a triggering event that would affect a key driver and then work backward.

- Example -

Assume Russia overcomes its difficulties.

"What if?" Statement: Russia in 2020 is a prosperous liberal democracy

Drivers: The state of Russia is shaped by: 1) capacity of the government to act, 2) the legitimacy of the regime, and 3) the economy.

Indicators: To assess the capacity of the Russian government (driver #1), the following could be monitored.

- Quality of leadership/organizational capabilities
- Responsiveness to popular demands
- Ability to deliver basic goods and services
- Internal Security Capabilities
- Effectiveness of civil/criminal justice systems

Structured Analytic Technique



Weighted Rankings / Decision Matrix

Purpose

To help assess available alternatives by weighting criteria in importance.

Description

Use this technique whenever you are choosing between competing options, i.e. trying to find the best choice. It can also be used to simulate the decision making process of an adversary.

Usage

Begin by listing all the options under consideration, E.G. *Al Qaida will attack Parliament Hill, Union Station, or Canada's Wonderland.*

Next, determine the factors that influence the choice of options, E.G. *Al Qaida likes to attack targets that are iconic, they like to damage infrastructure, and they want mass casualties.*

Create a matrix by arraying the options against the factors. Score each cell. Give it a 10 if the option scores high against the factor, E.G. Parliament Hill is very iconic, it gets a 10.

	Parliament Hill	Union Station	Canada's Wonderland
Iconic	10	3	0
Infrastructure	3	8	1
Casualties	3	9	5
Raw Score	16	20	6

At this point, all factors are weighted equally. To make the process more realistic, determine which factors have the most influence. E.G. If the target must be iconic, give it 50% of the *weight* of the decision.

Assign weightings to each factor, then multiply the weightings by the scores in each cell to get weighted scores (in red).

	Parliament Hill	Union Station	Canada's Wonderland
0.5 Iconic	5.0	1.5	0.0
0.2 Infrastructure	0.6	1.6	0.2
0.3 Casualties	0.9	2.7	1.5
Weighted Score	6.5	5.8	1.7
Raw Score	16	20	6

Notice that, in our example, the preferred target changed from Union Station to Parliament Hill.

End by conducting a sanity check of the results and reviewing the impact of the weighted criteria on the final result. This review should provide the insight needed to present the results in a clear and persuasive manner to customers.

Requirements

A good (ideally exhaustive) set of options should be considered.

The factors chosen must be relevant and their weightings as accurate as possible.

Strengths

Aids decision-making by putting things in order.

Avoids the unsystematic and therefore inconsistent use of criteria to make choices.

Weaknesses

Can be overly simplistic.

Mirror imaging may be a problem if used to emulate the thinking of an adversary.

Name: _____

SAT Review Quiz - Imagination Techniques

For each situation choose the technique that would be best to use initially. Explain your choice.

- | | |
|-------------------------------|-------------------------|
| 1. Alternative Futures | 4. Cone of Plausibility |
| 2. Mind Maps and Concept Maps | 5. Force Field Analysis |
| 3. Structured Brainstorming | 6. What if? Analysis |

Situation "A": The boss wants some new ideas.

Analytic technique: _____

Situation "B": Time is critical and the boss wants three possible scenarios for the future. You don't think the situation will change, but you want to consider the most likely variation as well as a remote possibility that could have a high impact.

Analytic technique: _____

Situation "C": The team needs a way to visualize a complicated problem with many inter-connected factors.

Analytic technique: _____

Situation "D": The government of a foreign nation may collapse. How could graphically depict the dynamic interplay of the forces for change and against change?

Analytic technique: _____

Situation "E": You want to work backward from a specific potential event to prepare your mind to recognize the signs of a significant change.

Analytic technique: _____

Situation "F": You have been asked to generate a series of future scenarios where the First Nations of Canada become increasingly radicalized and violent.

Analytic technique: _____

Name: _____

SAT Review Quiz - Challenge Techniques

For each "situation" choose the technique that would be best to use initially.

Explain your choice.

- | | |
|--|---|
| 1. Devil's Advocacy | 5. Structured Self-Critique (Peer Review) |
| 2. Dialectic Inquiry | 6. Key Assumptions Check |
| 3. Outside-In Thinking | 7. High Impact – Low Probability |
| 4. Structured Debate (Team A – Team B) | 8. Pre-Mortem |

Situation "A": There are two opposing points of view on an issue. To highlight rather than bury the differences of opinion, you decide to organize two teams to argue both points of view.

Analytic technique: _____

Situation "B": You designate someone to point out the flaws in your argument.

Analytic technique: _____

Situation "C": You want a more formal test that will use a team to systematically expose assumptions, test the evidence, and generate alternative explanations.

Analytic technique: _____

Situation "D": You decide to assume that time has passed and the event you predicted has not occurred. You ask yourself, "Where did I go wrong?"

Analytic technique: _____

Situation "E": Before publishing, you decide to get feedback from your peers.

Analytic technique: _____

Situation "F": You've heard that bad assumptions are at the root of most intelligence failures.

Analytic technique: _____

Situation "G": Decision-makers are convinced that an event is unlikely but you feel they should be warned that a long-shot development poses a credible risk.

Analytic technique: _____

Situation "H": There may be exogenous (external) variables at play that you had not considered.

Analytic technique: _____

Name: _____

SAT Review Quiz - Diagnostic Techniques

For each "situation" choose the technique that would be best to use initially. Explain your choice.

- | | |
|-------------------------------------|--|
| 1. Analysis of Competing Hypotheses | 5. Weighted Rankings / Decision Matrix |
| 2. Indicators Validator | 6. Red Team |
| 3. Social Network Analysis | 7. Structured Comparison |
| 4. Red Hat (Anthropology) | 8. Decision Trees |

Situation "A": To prepare for an upcoming G8/G20 meeting, you need to form a team that will think like anti-globalization protestors to help anticipate their activities.

Analytic technique: _____

Situation "B": Several theories have been advanced about the intentions of a local anarchist group. How could you "rule-out" some theories as least consistent with the evidence so far?

Analytic technique: _____

Situation "C": A fragile coalition of groups has formed to oppose the G8/G20 summit. Which technique might suggest ways of fragmenting this coalition?

Analytic technique: _____

Situation "D": Several locations are available for surveilling the meetings of a radical group. All offer advantages and disadvantages. How could you decide which was best?

Analytic technique: _____

Situation "E": With very limited resources, you can only monitor two of five potential indicators. How might you select the best two?

Analytic technique: _____

Situation "F": What academic discipline would help you to understand a radical environmental group?

Analytic technique: _____

Situation "G": You want to visualize possible permutations like the branches of a tree.

Analytic technique: _____

Situation "H": The boss wants you to prioritize the terrorist groups in your jurisdiction according to a given set of criteria.

Analytic technique: _____

Glossary of Intelligence Terms

Abduction: reasoning to the best possible conclusion in light of available evidence. It is sometimes known as intuition, probabilistic assessment, or creative thinking. This type of reasoning is very common in intelligence analysis.

All-source intelligence: the combination of open and clandestine sources of information.

Analysis: See Intelligence Analysis.

Analysis of Competing Hypotheses (ACH): a structured analytic technique that places evidence in rows and hypotheses in columns. Each piece of evidence is scored against each hypothesis as either consistent, inconsistent, or neutral. The technique finds the hypotheses with the best fit to the available evidence and disconfirms competing hypotheses.

Argument: a series of statements (premises) leading to a conclusion. A premise is a supporting piece of information (fact, opinion, observation). A conclusion is the end product of an argument; it is also known as an inference.

Assessment: new knowledge by means such as interpreting data or making a forecast. It is focused more on strategic, or long-term, issues. Some intelligence services refer to such assessments as estimates.

Assumption: something which is taken for granted. May be explicit (clearly stated) or implicit (not stated).

Best Practices: processes, procedures, or habits that lead to good results.

Caveat: a formal notification or warning.

Classified Information: information that could reasonably be expected to cause injury to the national interest.

Cognitive Bias – a tendency to think a certain way due to inherent functional limitations of the human brain.

Collation – The process of logging, sorting, and categorizing raw information. A step in the intelligence cycle that follows collection and precedes analysis.

Collection: gathering data.

Collection Discipline: the various means by which intelligence ("INT") is gathered. Includes COMINT, ELINT, GEOINT, HUMINT, IMINT, OSINT, MASINT, and SIGINT.

Collection Plan: see Intelligence Collection Plan.

Collection Requirements: information needed to satisfy an Intelligence Requirement.

Communications Intelligence (COMINT): intelligence derived from electromagnetic communications and communications systems. A subcategory of SIGINT.

Data: information that has not been evaluated or put into context.

Deduction: A type of reasoning where if the premises are true, then the conclusion is generally true. This process is used whenever evidence is offered in support of a hypothesis.

Denial and Deception: Denial is restricting access to information about plans, assets, or other important information, and it is carried out through means such as silence or concealment. Deception is steering observers away from vital information, and it is conducted by providing alternative and false information that is still plausible.

Devil's Advocacy: a structured analytic technique in which counterarguments are presented.

Dissemination: the process of distributing analytic products to those who need it in a timely fashion.

Electronic Intelligence (ELINT): intelligence derived from electromagnetic non-communications transmissions. A subcategory of SIGINT.

Established Source: a Human Source who has been successfully validated and whose relationship with the handler is fully developed in terms of direction and control. (Source établie)

Evidence (Indicators/factors): observable phenomenon or information.

Facts: information which is judged to be true. Facts are used to substantiate statements and arguments.

Fallacy: an error in reasoning. Logical fallacies have a flaw in their structure. Informal fallacies have a valid structure, but one or more premises are false.

Feedback: comments on analytic products from readers.

Foreign Instrumentation Signals Intelligence (FISINT): technical information or intelligence derived from the collection, processing and analysis of foreign instrumentation signals such as telemetry, beaconry, electronic interrogators, and video data links (drone images transmission). A subcategory of SIGINT.

Geospatial Intelligence (GEOINT): see Imagery Intelligence.

Human Source: a person who provides information. Their identity is usually protected.

Human Intelligence (HUMINT): information provided by human sources.

Hypotheses: a theory, a possible explanation.

Induction: A type of reasoning where one observes a series of events (empirical data) to build a theory (general principal). Any generalization is an example of induction. This process is used by academics, scientists and strategic analysts.

Inference: a conclusion that comes from evidence.

Imagery intelligence (IMINT): images from traditional hand-held photography, as well as satellites and high altitude aircraft. See: Geospatial intelligence (GEOINT).

Information: unevaluated and unprocessed data of any type that has been openly or clandestinely collected. Information when processed may produce intelligence.

Intelligence: a broad term, used to describe both the input and output of the intelligence process. The term could refer to the raw information collected by an intelligence agency or information that has been processed into an analytic product.

Intelligence Analysis: the process of adding value to information. It involves gathering, organizing, evaluating, analyzing, and presenting finished intelligence to decision makers.

Intelligence Collection Plan: a plan for gathering information from available sources to meet an intelligence requirement.

Intelligence Cycle (or Process): the sequence of activities whereby information is obtained, assembled, converted into intelligence and made available to users. This sequence comprises the following phases:

- direction: the determination of intelligence requirements;
- planning: planning the collection effort, and issuance of orders and requests to collection agencies;
- collection: the exploitation of sources of information and the delivery of the information obtained to the appropriate processing unit;
- analysis: the processing of information into intelligence through collation, evaluation, integration and interpretation;
- dissemination: the timely conveyance of intelligence, in an appropriate form and by any suitable means, to those who need it. This last phase can include feedback from the client which is then used to adapt existing, or formulate new intelligence requirements.

Intelligence Requirement - IR: any subject, general or specific, upon which there is a need for the collection of information or the production of intelligence.

Knowledge (or understanding): facts that have meaning because they have been put into a context, such as patterns and relationships that provide insight into causes, reasons, and implications.

Link Diagrams: drawings showing relationships between entities (persons, places, and things). These diagrams aid investigators and analysts by uncovering, interpreting, and displaying complex information in easily-understood chart form.

Measurement and Signature Intelligence (MASINT): intelligence obtained by quantitative and qualitative analysis of electromagnetic and acoustic emanations. Includes analysis of physical evidence (E.G. DNA, fingerprints, footprints, fiber samples, smoke from factories, etc).

Mindset - a set of assumptions about the way the world works. A frame of mind.

Need-to-know: the principle whereby an individual is provided with access only to the classified or designated information needed to properly carry out their current duties or responsibilities.

Open Source Intelligence (OSINT) is intelligence based on information collected from sources open to the public such as the media, books, or the Internet.

Processing: putting the data into forms that analysts can use, for example by decrypting or translating it.

Reasoning: the act of forming conclusions. There are three types: inductive, deductive, and abductive.

Red Team: a structured analytic technique to look at situations from the opponent's point of view.

Risk Assessment: the likelihood of a threat materializing and its consequences. Typically examines the probability of the threat, the vulnerability of the target and the impact of an attack or incident to determine a risk score.

Qualitative Analysis: the examination of non-measurable data related to attributes or characteristics (subjective properties).

Quantitative Analysis: the examination of measurable and verifiable data (objective properties).

Signals Intelligence (SIGINT): intercepted signals and audio surveillance. Includes communications intelligence (COMINT), electronic intelligence (ELINT) and foreign instrumentation signals intelligence (FISINT).

Structured Analytic Techniques: approaches to analysis that are formal and systematic.

Tactical Intelligence: Tactical issues involve actual or imminent combat, and take place in a limited timeframe (hours and days) and space (the battlefield).

Team A/Team B Exercise: a structured analytic technique whereby two groups are given the same data, but they evaluate it separately to see if they come to similar, or different, conclusions.

Target: an individual, group of persons or organization whose activities are reasonably suspected of constituting a threat.

Threat: any potential event or act, deliberate or accidental, that could cause injury.

Threat Assessment: the process of identifying threats to things or from things. The "agent of threat" may be man-made (e.g. terrorist) or natural (e.g. flood). If man-made, the assessment normally covers the motivation, intent and capability of the "agent of threat". A threat "scenario" typically identifies the agent, the action, and the target. The threat assessment usually estimates the probability of the scenario.

Terrorist: An individual who has or will engage in, assist, commit or conduct a politically, religiously or ideologically motivated act of serious violence against persons or property.

Tradecraft: the set of practices that have evolved over time and define a particular activity or trade.

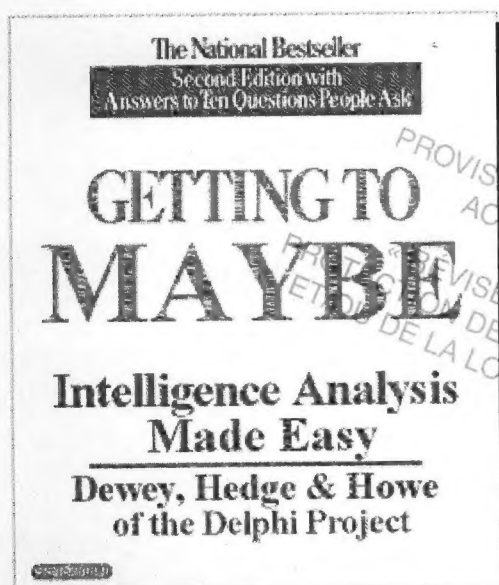
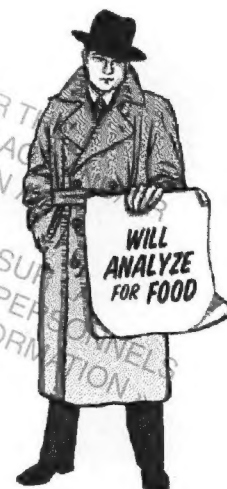
Operational Intelligence: deals with a series of battles, or a campaign, that take place over a longer period of time (weeks and months) and in a wider space (theatre of operations).

Strategic Intelligence: long term trends, as well as various possible scenarios to better understand options, outcomes, and expected reactions.

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- ☐ Single
- ☐ Married
- ☐ It's complicated
- ☐ In a Relationship
- ☒ Still analyzing the question

